THE IRON TRADE REVIEW

VOLUME XXX. CLEVELAND, O. NOVEMBER 18, 1897. CHICAGO, ILL. NUMBER 46

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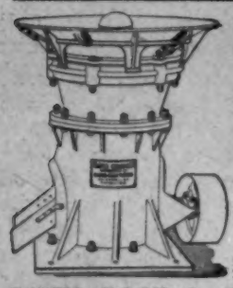

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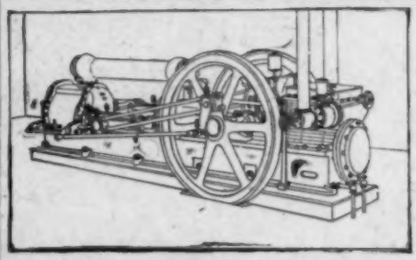

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THE WEEK IN IRON CIRCLES.

The report of slightly weaker prices in iron and steel, resulting from the suspension of buying in large lots, is more general this week. Yet the same week has brought confirmation of what has been predicted right along concerning costs for 1898—an advance in wages at all furnaces in the Mahoning and Shenango valleys—which adds from 7 to 12 cents a ton to the cost of iron from those districts. Labor at Lake Superior mines will come next; and a few weeks hence will come the coke advance, amounting to 40 to 55 cents per ton of iron, according to the price paid this year. But the increased cost argument weighs little in comparison with that of the relation between present consumption and the rate that may be looked for in the first half of 1898. The blast furnace returns show that in the face of production at the rate of 11,000,000 a year at the opening of the month, stocks of iron in furnace yards decreased 79,000 tons in October, not counting those of large steel works, which it is known were reduced considerably in that month. A few additional furnaces will be shown on the active list in the statement of Dec. 1, but with the price of pig iron stationary or receding, there can be no inducement to add much to present production. The margin is too small. Northern irons are all somewhat weaker than in the early part of the month. What keeps Southern irons firm is the fact that in that section producing capacity is smaller, in comparison with business booked, and the slacking of demand still leaves the leading furnaces shipping more iron than they make, while in some cases warrants are being bought by sellers to supply pressing orders. Some Northern sellers of foundry iron are now 25 to 35 cents below the prices they held at the beginning of the month. Bessemer pig iron is inactive. Buyers are offering $9.50 at valley furnaces for December iron, while furnaces, being generally well sold, make no response, though $9.65 can readily be done. For the first three months of 1898, $9.90 has been done, but the margin over probable cost is not enough to induce makers to trade. The general feeling in finished material is undoubtedly weaker, though there are a few exceptions. For billets $15 and $15.25, Pittsburg maker's mill, is talked of as the basis for the first three months of 1898, and now that the pressure for early deliveries has been relieved, prices have settled to $15 valley and Wheeling, and $15.25 to $15.50 Pittsburg, for November and December. In finished products bars and plates are generally weaker. On the latter, Pittsburg mills are asking 1.05c as against 1.10c two weeks ago. Valley mills are more eager for bar iron business, and manufacturers of steel bars are dropping extras, while on base sizes 1c Pittsburg is a common quotation. Reports concerning wrought pipe and tubes vary somewhat. There has been some shading of agreed prices lately, and a meeting was held to secure unifomity. Meantime some makers have been having a larger business, with the result that they are holding better the discounts of the association. On sheets, prices are better maintained than on the average of rolled material, and mills in position to make reasonably prompt deliveries are doing a remunerative business. The rail situation has not developed for next year, but large expectations for renewals by steam roads are entertained. For electric roads the outlook is not so well defined. Questions of finance must be settled before new schemes can be pushed; yet those in position to know are sanguine. The tin plate market drags. The price of steel for the first half of the new year is one uncertain factor.

THE CLEVELAND DISTRICT.

The iron ore situation shows no change in the past week. The presence in Cleveland of representatives of the leading Pittsburg and Chicago interests has been construed in some quarters as significant of important developments for next year. Their errand, however, had nothing to do with ore questions, nor yet with steel rail questions—in short, was not related to the iron trade. Lake Superior shipments are now practically ended, barring Marquette, and the close of another week will see the end of shipments at all ports, outside of a few stray cargoes.

Pig Iron. An interval of quietness is noted, in Bessemer pig iron, with no transactions reported, barring one in the latter part of last week, which was for 3,000, tons first quarter of 1898, at $9.90. The feeling is weaker, being represented by $9.50 offered and $9.65 asked for December iron. Higher cost in 1898 is conceded, but with steel receding, buyers are disposed to expect a continuation of to-day's prices through the first quarter of next year. There may be another month of inactivity before the basis for the new year is established by any large transactions. The advance in wages applies to all Mahoning Valley furnaces; in the Shenango Valley it is not entirely settled as yet whether the same or a greater percentage of increase will be granted. Foundry iron is weaker, and $9.75 at valley furnace for No. 2 can be readily done, with some offers reported at a lower price. Gray forge is also weaker, at $9, valley furnace. We quote Cleveland prices:

Bessemer	10 25	Valley Scotch No. 1	$10 90@11 25
No. 1 Strong Foundry	10 90@11 15	Valley Scotch No. 2	10 25@10 50
No. 2 Strong Foundry	10 25@10 50	Gray Forge	9 50@ 9 65
No. 3 Foundry	10 00	Lake Superior Charcoal	12 00@12 25

Finished Material. No large business has come up in the local market. While all the mills in the valley and Cleveland districts are running full, there is more anxiety by some valley sellers for tonnage for the winter, and lower prices have been quoted, particularly on bar iron, which is on a 1c basis valley, with extras waived in connection with desirable business. Steel bars are quoted 1c Pittsburg, but this has been slightly shaded by valley mills. Sheets have been active for the past two months and on prompt orders prices are well maintained on a Cleveland basis of 2.05c for No. 27 and 2.10c to 2.15c for No. 28. On pipes and tubes business is of only fair proportions. While discounts are generally maintained, reports of cutting are more numerous. Structural material remains on the basis of 1.10c Pittsburg for beams and channels; tank plates and angles at 1.05c Pittsburg.

CHICAGO.

OFFICE OF *The Iron Trade Review*
1142 MONADNOCK BLOCK, Nov. 17.

Business in every branch of the trade has been almost exclusively in small lots, and there does not appear to be any disposition on the part of either buyers or sellers to increase the scale of transactions. The mills and furnaces all report full order books, and most of them are not in position to accept any very large business for delivery the balance of this year; in some cases capacity is taken up for several months into 1898. The consumers, on the other hand, are apparently not anxious to place their business for next year immediately, but are willing to wait until their needs for the coming year are more fully known to them.

PIG IRON.—The foundry pig iron situation is about as strong as it well could be. Furnaces all report heavy shipments, and that consumers are taking their iron as fast as it can be shipped. The production of pig iron is nearly at a maximum at the present time, and there does not seem much probability of its being increased a great deal more, with the present basis of costs and selling prices. The largest local producer is understood to have sold up for the next five or six months, and to be unable to accept further business for that time, except in such small quantities as it may be possible to get in. The Southern furnaces are nearly as well sold up as those at the North, and are fully as well off regarding shipments. The stocks at Southern furnaces are reported to be very small, and decreasing all the time. Several of the furnaces have found it necessary to buy warrant iron to ship on their contracts, it is said, being so short of some grades as to be unable to fill all orders from the current production. Sales in this market last week were lighter than in the week previous, both of Northern and Southern iron, the former recording the larger tonnage for the week. Quotations are unchanged. Some talk is heard of cut prices on Southern irons, but if they have been made, it is presumably on warrant irons. Quotations from the furnaces are as strong as ever.

Lake Sup. Charcoal	$12 50@13 00	South'n Coke No. 3	$10 35@10 60
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 1 Soft	11 00@11 25
Local Coke Fdy. No. 2	11 00@11 50	Southern No. 2 Soft	10 60@10 85
Local Coke Fdy. No. 3	10 50@11 00	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 50@11 00	Alabama Car Wheel	16 00@17 00
South'n Coke No. 1	11 00@11 25	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 60@10 85	Coke Bessemer	11 50@12 00

BARS.—Sales have not been large, although one or two orders for good sized quantities were closed. One was for 500 tons. Prices are no weaker, and are made at 1.15c to 1.20c for common iron; 1.20c to 1.25c for guaranteed iron, and 1.20c to 1.25c for soft steel bars from strictly billet stock.

CAR ORDERS.—No new inquiries for cars have been received, and the orders placed last week were only for small lots. Some business has been done in car material, the largest order being of 3,500 tons for the 2,000 cars which were placed two weeks ago. This includes about 2,000 tons of axles, the balance being angles and plates. Other orders of material were small.

RAILS AND TRACK SUPPLIES.—Sales of rails were only small, and were almost entirely confined to light sections. The local mills are not pushing for next year's business yet, but are trying to arrange with the roads for as extended deliveries as possible before closing contracts. Prices are as follows: Rails, $20.50 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—There is nothing new in this market, sales being nil, at least from the local mills. Billets are still quoted at $18 to $18.50, and rods at $25 to $25.50, but both prices are only nominal.

STRUCTURAL MATERIAL.—The Wells building, figured upon some time ago, is being refigured, and will probably be let soon. It will take about 700 tons of steel. The Studebaker building, on Michigan ave., is to be remodeled, and this will take about 700 to 800 tons of steel. No other new business has come up. No large contracts were placed last week, and none are expected to be closed very soon. There is a disposition to make lower prices on sheared plates, but aside from these quotations are unchanged as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.20c to 1.25c; plates, 1.30c to 1.35c; tees, 1.30c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—Very little business has been placed in this market. The inquiry for 5,000 tons of ship plates was refused by the local mills, as they could not comply with the requirements as to delivery. General business is light, and the demand does not show any indications of increasing immediately. Quotations are as follows: Tank steel, 1.30c to 1.35c; flange steel, 1.40c to 1.45c; fire-box steel, 1.85c to 5c.

SHEETS.—Local dealers report a fairly good demand, but sales are in nearly every case only for small lots. In one or two cases quite good sized contracts have been placed. Quotations are made at 2.20c to 2.25c for No. 27 black and 80 and 5 to 80 and ½ per cent discount for galvanized.

MERCHANT STEEL.—There is a good demand, particularly for small lots for immediate delivery, and store business is very good. Prices follow: Open-hearth spring tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—Some business in large lots was done last week, but most of it was for delivery in other markets, and the orders will be filled with material which does not come here. Prices are inclined to be weaker, and in some cases have been lowered a little. Dealers' selling prices are as follows:

Old iron rails, gross	$12 00@$12 50	Axles, net	$14 00@$14 25
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 00@ 9 25	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	10 50@ 11 25	Axle turnings, net	7 25@ 7 50
Railroad forge, net	11 75@ 12 00	Mixed steel, gross	7 00
Dealer's forge, net	9 00@ 9 50	Stove plates, net	6 00@ 6 25
No. 1 mill, net	8 00@ 8 50	Heavy melting steel, gr.	8 00@ 8 25
Heavy cast, net	7 75@ 8 25	Old iron splice b., net	13 25@ 13 75
Malleable cast, net	9 00@ 9 25		

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, Nov. 17.

In general conditions for the week were quieter and additional lines encountered weaker prices. Billets can be had so much more readily than for some weeks, that the higher prices paid for shipments this year no longer rule. Sheared plates are quoted low. An exception to the general report is the demand for wrought pipe, which in one mill at least touched the top notch of the present rise last week. In the face of advanced wages in the valleys pig iron is weaker.

PIG IRON.—The week has been quiet. The low-priced sales of speculative iron in the last two weeks color the present situation and the feeling is weaker. Offers of $9.50 by buyers and $9.65 by sellers have failed to develop transactions, and nothing can be done for next year. A general increase in wages at valley furnaces is announced for Dec. 1, thus adding a new factor in next year's cost. Gray forge has weakened during the week and is quoted at $9.50, Pittsburg, with furnaces generally anxious to sell. Sales of foundry irons for the week are of good proportions but at the lowest quotations. We quote:

Bessemer, valley	$ 9.65
Bessemer delivered Pittsburg District	10.25 to 10.35
No. 1 Foundry	10.75 to 10.90
No. 2 Foundry	10.25 to 10.40
No. 3 Foundry	10.00
Gray Forge	9.50

BILLETS.—The week has brought a marked improvement in deliveries on billet contracts and this has been evidenced in lower quotations. With the difficulty in getting prompt material removed, prices come nearer to their normal relation with Bessemer pig. Sentiment has been weak and $15 and $15.25 are talked of. Steel in the hands of Eastern speculators is reported to be offering at these prices but no sales are reported. The situation is very quiet with a general feeling of weakness.

SHEET BARS.—Sheet and tin bars for present use are no easier to get and bring $18 and $18.25 in spite of lower billets. Shipments are still lagging badly.

RODS.—Rods are still scarce but are lower than a week ago, owing to somewhat better shipments. Stocks in middle hands are quoted at $23 and $23.50.

STRUCTURAL MATERIAL.—Structural orders are gradually receding to winter proportions. Last week's tonnage was somewhat larger, orders on contract coming in more freely, but there is little new work ahead. Prices do not weaken and mills are asking for beams 15 inches and under, 1.10c; 15 to 18 inches, 1.20c; tees, 1.20c; zees, 1.10c; angles, 1.10c; and universal plates, 1.05c.

PLATES.—There is more eagerness for plate orders as de-

mand falls off and quotations have weakened during the week. For open-hearth and Bessemer tank, 1.05c is now asked and 1c is reported to have been done. On shell, 1.15c is quoted and 1.20c on flange.

SHEETS.—Much more could be done in black sheets were orders calling for deliveries beyond January generally considered. Just now there is a general tendency to wait for developments of the new year. Sales are reported for January delivery at the association schedule and for present use small gauges continue to bring a premium, 1.15c and 1.20c having been paid for November and December deliveries. Quotations for January delivery are made with 2.10c for No. 28 as a base. Galvanized sheets are quoted at 80 and 5 per cent off list and black sheets for tinning at 2.30c makers' mill.

BARS.—Valley iron is being quoted at 1.05c and 1.10c but there is greater pressure to sell. Local iron is less active, 1.15c being quoted on common and 1.25c to 1.35c on all-muck bar. Steel is quoted at 1c and interests that advanced prices to 1.05c and 1.10c are taking everything available at 1c.

PIPES AND TUBES.—After three quiet weeks the sales of last week were again heavier and one of the leading pipe interests booked the heaviest week's tonnage of the year. The call for boiler tubes is still heavy and merchant pipe is also much in demand. The firmness of the market is further contributed to by the delays in shipments. Barring two or three smaller interests mills are holding the agreed discounts as follows: Butt weld black, 72 per cent off; lap weld black, 78 per cent off; butt weld galvanized, 67 per cent off; lap weld galvanized, 70 per cent off. The second discount is 10 per cent on car load lots. Discounts on merchant boiler tubes are as follows: 2¼-inch and smaller, 72½ per cent off; 2½-inch and larger, 75 per cent off.

FERRO-MANGANESE.—Quotations are made for 80 per cent domestic, of $47.50 and $48, depending on size of order.

OLD MATERIAL.—Buyers of scrap are holding off, probably for the developments of next year. The sales made have been mainly compulsory and prices paid were lower. We quote nominally as follows: Old iron rails are quoted at $14 and $14.50; old steel rails, $10.50 to $11; No. 1 wrought $12.50, net; cast scrap, $9 to $9.25, gross, and car wheels at $11.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Cincinnati

Rogers, Brown & Co.'s review of the pig iron market says: "The demand for pig iron during the past week has consisted mostly of small orders for early delivery. Large buyers, as a rule, purchased to cover this year's requirements during September's activity, but some of them find that on account of shortages of certain grades, the furnaces from whom they purchased cannot supply them, and they are obliged to buy from others who happen to have the iron on hand. Shipments are going forward freely, and no requests are received to withhold them. On the contrary, much time is absorbed in answering telegrams and letters stating the urgent need of consumers. This applies to both iron and coke. Although the recent rains have helped in some quarters, yet there are a number of important coke operations very much behind on account of the drought. Private advices from the South show a decline of about 49,000 tons in Alabama stocks during October. The car famine there is perhaps a little less pronounced, altough still decidedly felt. Prices of Southern irons remain unchanged by the furnaces, but occasionally sales are made by holders of warrants, at the usual differences. If the present lull continues, it is believed that with the exception of a few strong holders, all the speculative iron will be disposed of. The movement in Northern brands is not heavy. Buyers of the so-called 'strong soft' Ohio brands, are supplying themselves in lots of 100 to 300 tons as usual. Most of the furnaces are fairly well supplied with orders, and are not eager sellers. We quote for cash, f. o. b. cars Cincinnati: Southern coke, No. 1 foundry, $10; No. 2, $9.75; No. 3, $9.45; gray forge, $9.25; mottled, $9; No. 1 soft, $10; No. 2 soft, $9.75; Hanging rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; standard Georgia car wheel, $14.25 to $15.

Buffalo.

The market is being watched by theose most interested, as a peculiar state of affairs exists. Almost all the foundries in this section are quite busy and furnaces are having their hands full to keep all supplied. We could naturally look, therefore, for a stiffening in price and general advance, but instead of this some iron has been offered at lower prices. The market has all the appearances of being a waiting one, so far as sales are concerned. There has been no pressure to sell on the part of producers and not much desire on the part of buyers to cover for next year's business. We quote below on the cash basis f. o. b. cars Buffalo: No. 1 foundry, $11.25; No. 2 foundry, $10.75; Ohio strong softener No. 1, $11.75; No. 2, $11.25; Jackson county silvery, No. 1, $14; Southern soft No. 1, $11.75; No. 2, $11.35.

Philadelphia

The statistical position of the trade is particularly strong and the reduction of stocks in October was more than many expected. As yet buyers and sellers have not arrived at any such understanding about 1898 as to lead to free trading. The trace of weakness that has come into the situation owing to the easing up of demand causes hesitation on the part of buyers, who look for the heavy production to bring still lower prices. Yet sellers are not persuaded of this. The cost sheet view leads them to expect a better price, since the tendency of wages and of raw materials is to higher figures. The low costs possible to the best equipped producers in the Pittsburg district are given prominence again, this line of argument being on the supposition that demand will not be up to production—a premise that is very generally disputed. New business in pig iron has been limited. There are inquiries for deliveries in the first quarter and first half of 1898. To-day's prices can be duplicated on deliveries extending through February, but as a rule buyers find it better to wait, and the wait may be prolonged quite well up to the end of the year. For No. 1X foundry $12 is about the market and $11.25 to $11.50 for No. 2, and $10.50 to $10.75 for No. 2 plain. Mill iron is held at $10.50 for standard and $10.25 for ordinary. Billets are weak compared with prices of three weeks ago, and buyers would scarcely offer $18.25 to-day; some business might be done at $18. Finished material is in fair demand, though not as active as in the early part of the month. Of the pending ship-yard business 5,000 tons is reported placed and further business is in sight for the mills, though it may not mature until after the new year comes in. We quote steel bars at 1.15c to 1.20c; refined iron at 1.15c; plates at 1 20c, angles at 1.15c to 1.20c, and beams and channels at 1.25c to 1.30c.

THE TIN PLATE MARKET.

The only change that can be noticed in the market is that the dull and unsatisfactory conditions referred to for several weeks past are even more dull and more unsatisfactory than at any time during the past year. It cannot be said that prices are any weaker; in fact there is no quotable change in prices named last week, and the general tone of the market is well maintained with few sellers anxiously seeking business for next year. All the mills are well supplied with orders running through the balance of the present year; in many cases they have booked a fair proportion of their capacity for next year. Moreover, the fact that tin plates continue to hold their price as well as they do is taken to argue that better prices will be obtainable as soon as the active buying begins, which must be about the first of the year.

Indications are that few of the projected mills will be able to furnish any quantity of plates until after the middle of 1898, and, in view of the prospect of heavy business from the can makers during the months of May and August it seems entirely probable that the capacity of the mills for next year will be well filled. We quote f. o. b. makers' mill, Pittsburg and Indiana districts, as follows:

CHARCOAL TINS.

	IC	IX
Lisvane Grade,	$3.45	$4.20
Calland Grade,	3.65	4.35

COKE TINS.

IC, 108 lb. Basis weight,	$3.00
100 lb. " "	2.90
95 lb. " "	2.85
90 lb. " "	2.80
85 lb. " "	2.75
80 lb. " "	2.70

TERNE PLATES.

IC, 216 lb., 20 x 28	$5.95
200 lb. "	5.65

These prices can be shaded at least 5c per box on large orders for deliveries during the first quarter of 1898, while some mills are asking slight advances over prices mentioned for any deliveries beyond April 1.

THE IRON TRADE REVIEW

DEVOTED TO IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES.

PUBLISHED EVERY THURSDAY BY

THE IRON TRADE REVIEW CO.,

CLEVELAND, OHIO.

CLEVELAND, 27 VINCENT STREET:

G. H. GARDNER President. A. I. FINDLEY, Editor.

CHICAGO:
1142 MONADNOCK BLOCK.
B. M. GARDNER, Associate Editor and Western Manager.

PITTSBURG:
807 TRADESMEN'S BUILDING.
JAMES R. MILLS, JR., Manager.

Subscription (strictly in advance), $3 per annum. Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW, through the regular channels of the American News Co

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

NOVEMBER 18, 1897.

THE PIG IRON SITUATION.

The November blast furnace returns, with their indications of a yearly rate of 11,000,000 tons of pig iron, and an accompanying reduction of nearly 80,000 tons in stocks, are significant. Something may be inferred, moreover, of the increase in furnace capacity that has been accomplished, even in two years, when it is stated that on November 1, 1895, at the top of the boom, it took 239 furnaces to yield an output of 217,306 tons a week. In other words, 56 more furnaces were active at that time and the output was only 4,000 tons a week more. Rapid driving, multiple tuyeres and more and better stoves are setting a pace which only the fittest can follow. This comparison gives ample ground for the statement that though there are many inactive furnaces, that are far from being worn out, there is no great amount of unused capacity that will come into line as long as prices remain substantially on to-day's basis.

But one more report from the furnaces remains for this year. With it a pretty close approximation could be made of the pig iron production in the United States for 1897. Official statistics for the first half of the year showed that 4,403,476 tons were turned out in that period. Estimating the second half of the year on the basis of returns from active furnaces month by month, and making the allowance suggested by comparisons between the official figures for other years and the monthly statements in those years, give 9¼ million tons as an approximation of the year's production. If this figure should be reached, it would come next to the 9,446,308 tons of 1895, with 1890 third, at 9,202,703 tons.

In the current issue of the *Bulletin*, Mr. Swank gives some interesting figures on the per capita consumption of pig iron in the United States. In 1850 it was 61.6 lbs. per capita; in 1860, 63.5 lbs.; in 1870, 105.6 lbs.; in 1880, 178 lbs.; in 1890, 320 lbs. On the probable consumption in 1897 the article makes this comment:

> A reasonably close estimate of our per capita consumption of pig iron in the year 1897 may be obtained by guessing at our population at the present time and also at our production and imports and exports of pig iron in the whole year. Our present population is not far from 75,000,000. Our total production of pig iron during the year may be placed at 9,500,000 tons, including our small imports. From this quantity may be subtracted probably 200,000 tons of pig iron exported during the year, making the total estimated consumption of pig iron in 1897 about 9,300,000 tons, or about 278 pounds per capita. This is a smaller per capita consumption than in 1890, but it will not be forgotten that in 1890 the trade conditions were more favorable than they have been in 1897, taking each year as a whole, and that open-hearth steel, which is so large a consumer of scrap, is now a much more formidable competitor of Bessemer steel, which consumes but little scrap, than it was in 1890. * * * If an inquiry were to be made concerning the total consumption of iron per capita—not pig iron only, but also everything that takes the place of pig iron in obtaining finished products, that is, cast and wrought scrap and old iron and steel rails, the consumption of which may be estimated at a million tons per annum in recent years, we would find that the per capita consumption above given would be increased in the later periods but would not be materially increased in the earlier periods, when we had no open hearths to require large quantities of old material and when the foundries and rolling mills used respectively only small quantities of cast and wrought scrap.

In making the calculation for 1897, the article assumes that there will be no net reduction in unsold stocks between the beginning and the end of the present year. It would seem at first thought that there would be a considerable reduction; yet it is to be remembered that in the first half of the year unsold stocks increased 125,000 tons, and that the 330,000 tons decrease in stocks in furnace yards from July 1 to Nov. 1 is of stocks sold and unsold. The important factor in the account is that referred to in the latter portion of the above quotation—the large addition that should be made to pig iron consumption to get a total representing the country's actual consumption of iron and steel. If this be reckoned at 1,000,000 tons we would have a total of 310 lbs. per capita for the year, as compared with probably less than 340 lbs. in 1890, making a smaller addition of old material for that year.

The increase in population is an element often lost sight of in making comparisons of iron production and consumption in different periods. When allowance is made for this growth, and for the wide and rapid extensions in the uses of iron and steel, compensating for the shrunken rail tonnage, of which too much is often made, the field for optimism in respect to the iron trade of the immediate future becomes enlarged at once.

THE early experiences of some blast furnacemen with multiple tuyeres did not come up to expectations, in the achievement of large outputs. This was in part because some of the claims of increased production were out of reason. It is well demonstrated by this time that blast furnace outputs are more than a matter of blast pressure; more, also, than a matter of quantity of air. Hence the predictions that doubling the number of tuyeres would double output were bound to be upset in actual practice. As time has passed, however, the good results of increasing the quantity of blast have been demonstrated; and late confirmation of the benefits of the departure is given in the output of Furnace No. 3 of the Duquesne group. Furnaces

3 and 4 were equipped with 20 tuyeres, in place of the 10 employed in Furnaces 1 and 2. Furnace 3 has now the distinction of making the world's record, not only for 24 hours but for a month. The greatest 24-hour output before was 691 tons, made by Duquesne Furnace No. 1. In one 24-hour period in October Furnace 3 made 711 tons of iron. The record for the month was 17,405 tons or 561 tons daily average, against 17,182 tons for a month, or 554 tons a day, the greatest previous record. While no official information is available on this point, we believe we are safe in saying that the big record made at Furnace No. 1 was on a mixture containing less of Mesabi ores than were experimented with at Duquesne at a later date, and that the world's record made in October at Furnace No. 3 was on a mixture containing not more than 40 per cent of these ores.

There has been a superabundance, lately, of foundry literature devoted to showing how little some one else knows about a subject on which he has essayed to write. For the moment the destructive method of foundry advancement is more in vogue than the constructive method. The tendency of it all is to prevent the recording of experience by men who really have something that would prove an addition to the common fund, but are deterred from giving it publicity lest they draw sarcasm or ridicule from the destructive critics. Certainly truth must be preserved and error must be pointed out; but neither the dogmatic way nor the patronizing way nor the high glee of self-isolated authorities can be commended as an encouragement of original investigation or as likely to raise the standard. More enthusiasm in the active pursuit of inquiries in lines not well illuminated, and less eager watching to hit the first head that shows itself, would be to the point.

STEADILY the imports of iron and steel run at a rate 50 per cent below that of the preceding year. It will be seen in the table below, covering September imports and nine months of imports ending with September in the two years, that pig iron shows the largest shrinkage, that rail imports have practically stopped, and that tin plates are dwindling all the time, the ratio between the two September amounts being greater than that between totals for the nine-months periods:

IRON AND STEEL IMPORTS TO THE UNITED STATES.—GROSS TONS.

	September.		Jan.—Sept.	
	1896.	1897.	1896.	1897.
Pig iron	2,487	1,480	52,126	11,333
Scrap iron and steel	668	209	7,737	908
Bar iron	1,092	1,235	12,742	9,309
Iron and steel rails	4,567	11	7,784	149
Hoops and band iron	1	26	25	27
Sheets and plates	797	175	5,877	1,892
Cotton ties	2,078	.....	6,345	105
Tin plates	8,054	4,587	99,869	68,112
Wire rods	908	1,005	15,183	10,782
Wire	191	331	2,931	1,895
	20,843	9,059	209,919	104,512

Iron ore imports will be comparatively light this year. For September they were 32,146 tons, against 56,448 tons in September, 1896. For the nine-months periods they were 381,748 tons and 603,715 tons respectively.

Mr. Oberlin Smith's See-Saw of 1891.

TO THE EDITOR:

Noticing the illustration of the Nashville Exposition see-saw and the description by Mr. S. Groves, in your Oct. 28 issue, and that it is spoken of as "a unique design, a triumph of engineering skill," etc., I wish to call your attention to the fact that a much more elaborate design of the same machine was made by me and offered to the World's Fair at Chicago. It was not built on account of the expense. This was illustrated in a number of the journals at the time—among them the *Scientific American Supplement*, of May 30, 1891.

OBERLIN SMITH.

OBITUARY.

The death of Charles E. Orr, of Pittsburg, came unexpectedly last Saturday morning at the Battle Creek (Mich.) Sanitarium, where for some time he had been taking treatment. His disease took a serious turn only a week ago and death resulted speedily. Mr. Orr was but 39 years old. He was a native of Franklin County, Pa. Most of his life was spent in

CHARLES E. ORR.

Pittsburg, where in 1884 he formed, with J. Frank Robinson, the firm of Robinson & Orr, iron and steel brokers. Of recent years Mr. Orr has given much attention to investments and securities and was vice-president of the Cincinnati, Newport & Covington Railroad. He was also a director in the company publishing the Harrisburg *Patriot*.

Gard Maynard, assistant secretary of the Illinois Steel Co., died in Chicago, Nov. 1, of typhoid fever. Interment took place at Marquette, Mich. He was born at Marquette, March 3, 1863. He was graduated from Yale in the class of '88, and soon after entered the service of the Illinois Steel Co. as bookkeeper. He was made auditor, and after filling other positions was elected assistant secretary of the company at the last annual meeting.

Charles A. Weed, president of the Tidewater Steel Co., and Charles Roberts, president of the South Chester Mfg. Co., were killed at Chester, Pa., Nov. 10, being struck by a Philadelphia, Wilmington & Baltimore express train, while walking on the track.

Blast Furnace Records Broken.

Furnace 3 of the Duquesne Furnaces of the Carnegie Steel Co., Ltd., produced during October, 17,405 tons, a daily average for the 31 days of 561 tons. This record surpasses anything yet done at the Duquesne plant and has never been equalled. The furnace was the third of the Duquesne furnaces to be blown in and at first caused no little annoyance. It is equipped with 20 tuyeres.

The highest record, previously, of any 24 hours had been 691 tons, which was made on Furnace No. 1 at Duquesne last year. The new record is 711 tons, and was made in October by Furnace No. 3.

Geo. A. True, who has been with the Whiting Foundry Equipment Co., Harvey, Ill., as mechanical engineer, has accepted a similar position with the Frontier Iron Works, of Detroit.

ENGLISH AND AMERICAN MACHINERY.

A London mechanical engineer (presumably) writing to the *Iron and Coal Trades Review*, gives the following, which contains the views of a representative of the Niles Tool Works Co., Hamilton, O., on the comparative efficiency of English and American mechanics:

At the present juncture the opinions of an engineer, thoroughly acquainted with the engineering industry on both sides of the Atlantic, on the existing labor struggle may be of interest. Mr. Accles is the European representative of the Niles Tool Works Co., who own the largest works of their kind in the United States, and the views expressed by him are the result of a question addressed to him by the writer:

"Why do we import American machine tools?"

"You import American machine tools," replied he, "simply because you cannot obtain anything like them in your own country. There are types of milling, boring, grinding, and other machines, which I defy you to procure from any British manufacturer, and every American machine you import sells ten more, as your people come to appreciate their superiority over anything you can obtain in your own country."

"How is it, accepting your words, you have been able to beat us in this department?"

"That opens up a very wide question, and the answer I give you is one you will hardly expect. It is in consequence of the superiority of the American mechanic. All the improvements which characterize the American machine tool are thought out in the shop, and chiefly by workmen. The American mechanic is given every encouragement to invent and utilize his ideas generally. Over here, I understand, in many cases a working engineer is not allowed to take out a patent in his own name."

"Without the least intention of boasting, I state as a bare fact, that we have outstripped you completely; and the fault for this lies on your side between the employers and their men. The average employing engineer in England is not practical, as we understand it; takes little or no interest in his business except looking after the profits. He has no constructive faculties, or, if he has, does not seek to exercise them. The men don't work—at least as we understand work on the other side of the Atlantic. Work seems as an abomination to the general English mechanic. Look at him now. His hours of labor are fewer than those of any of his class in any part of the world, excepting a small body of men in New Zealand, and yet he is not content—being engaged in throttling the productive industries of the country in an attempt to work fewer hours still. The American artisan, as I have said, works longer hours than the Englishman; but not only does he do this, but he works much harder."

"What hours?"

"Fifty-nine."

"Pay?"

"Two pounds fourteen shillings a week."

"If your workmen should by any means be successful in their insane endeavor, it will be the means of knocking off (as compared with us), no less than 11 hours a week from your productive powers. It will be the finest thing for American manufacturing industry imaginable. So far as the American engineering business in this country is concerned, we sell purely on merit." But we look forward to the time when we shall be in a position to break the back of your home trade by cheapness as well. Your men talk about requiring 'more leisure.' Give them their present demand, and they will, before long, have leisure enough—more than they will want.

"Nothing has impressed me more in my journeyings through the industrial centers of this country than the striking difference which exists in the aspect of the interiors of the engineering shops over here and those in the United States. I will undertake to say that an average American turns out at least three times the output of the average Englishman; and he does his work cheerfully. The American seems to have his heart in his work, while on this side the general principle appears to be to do as little as you can and get away from your work as soon as possible. They drag along their hours with a languid, lazy demeanor which is in really puzzling contrast with the cheerful, bustling activity characteristic of the American machine shop. And why? Simply because the American depends on his individual energy and ability for his advancement and success in life, whilst the Engilshman relies on his union.

"'Let me conclude by this:—Despite his 59 hours a week, I say the American working engineer lives a higher standard of life, possesses more comforts, is more intelligent, and is better educated than his English competitor. He is better housed, better clothed, and has more money than has the mechanic of this country. I dare say it will be retorted that the higher wages in the United States are compelled by the fact (as alleged) that the necessaries of life are more expensive than they are in this country. That is all nonsense. It might have been so many years ago, although even then the statement never applied to food products, which are actually much cheaper than they are here. The fact is that middle-class living is cheaper and better in the United States than it is in Great Britain. If the American mechanic enjoys liberal wages, he earns them, and so long as he does that it does not matter to his employer how high they may be."

CRITICISIMS ON AN ANNEALING FURNACE.

Geo. Tomkinson, of West Smethwick, Eng., patentee of annealing and other furnaces, who has visited the United States on different occasions in the interest of his inventions, writes us concerning a design for a tin plate annealing furnace described in *The Iron Trade Review* of July 8, in an article by "Tin Mill." Mr. Tomkinson offers these criticisms of the furnace in question: "Having had over 30 years' experience in this kind of work and having taken out letters patent in Great Britain and the United States, I take this opportunity to draw your attention to features of the furnace recommended in the article, from which I should beg to differ. One thing shown in the drawing you reproduce is of no value, as compared with several now in use. That is the unreasonable and tedious covering and uncovering required. Not only this, but if by any means the ring in the top pot should become displaced, there would be danger of the partial demolition of the furnace. This happened some years ago, at the Chillington Iron Works, Wolverhampton, and the furnace had to be pulled down.

"But the main objection to the plan as shown in the drawing is, that it shows the grate at one end of the furnace with the stack at the opposite end. Then the flame from the grate is shown passing through an opening left into a large chamber surrounding the inside oven, and in this chamber meeting another wall with three holes leading into the heating chambers. The flame is supposed to pass through these three smaller apertures. My objection is that the flame on entering the large surrrounding chamber would be bound to circulate around this outside space before it would pass through the small aperatures. Not only so, but if any part of the flame did pass through to the box it would meet the pot on one side only, the arrangement requiring it to force a passage right through the whole series of heating chambers. There is nothing to keep the accumulated heat, if any, in the one chamber, but it is bound to pass immediately to the damper, and, as stated before, the largest amount would pass around the general outside chamber."

Mr. Tomkinson's annealing furnace, which has been exploited in this country, will anneal from 10 to 18 tons of 38 gauge to 40 gauge tin plates, the time required being 16 to 18 hours, as against 36 hours in the ordinary furnace. The fuel consumption is 2½ cwt. per ton annealed.

At a meeting of the Otis Steel Co. in London three weeks ago, J. T. Smith, chairman, reported that in 13 months' trading there had been a loss of £2,946, or, adding interest on debenture bonds, a net cash loss of £7,209. Mr. Jeremiah Head said that £19,711 had been spent in the year in additions and improvements to machinery. The depression in the iron trade of the United States was given as the cause of the losses, and the report was adopted by a practically unanimous report.

The Meehan Boiler & Construction Co., of Lowellville, O., has recently secured orders from the Ohio Iron & Steel Co., Lowellville; the Mahoning Valley Iron Co., Youngstown, and the Alice Furnace Co., Sharpsville, Pa., for its water tube attachment, for blast furnace boilers.

LAKE SUPERIOR IRON MINES.

At the Aurora mine at Ironwood, Mich., a steel head frame will be erected at the new shaft that is to be sunk 800 feet north of the present workings, or on the opposite side of the open pit. Timbers for this work were on the ground, but the decision was finally made to employ steel, its advantages in many particulars being convincingly shown. The work of erection is after plans of the Wellman-Seaver Engineering Co., of Cleveland. It is probable that this innovation will lead to the further use of steel for this purpose, in the Lake Superior region. The hoisting machinery for the new shaft is to be built by the Webster, Camp & Lane Machine Co., of Akron, O. It will be a balanced cage hoisting plant similar to that installed by the same makers at the Aragon mine last year. It is especially adapted to the handling, with greatest steam economy, of large quantities of ore from mines in which ore is only taken from two or three levels at a time, the upper levels being closed by the caving system as greater depths are reached.

The Newport mine on the Gogebic range is being worked for a larger output under Ferdinand Schlesinger's control. A number of surface improvements are under way looking to the handling of a large amount of ore next season. About 350 men are employed and 1,200 tons a day will be the average production this winter.

The ridiculous statement has been telegraphed, that of the 11¼ million tons of Lake Superior ore shipped up to Nov. 1, 75 per cent is on Lake Erie docks, to be shipped to furnaces the coming winter, the conclusion being drawn that a profitable winter's business is ahead of the railroads interested. As everybody connected with the trade knows, the percentage of direct shipment ore has been greater and greater in the past few years, and the probabilities are that less than one-third the total of this year's shipments went on the docks, much of that on account of the shortage of cars.

The Lake Superior iron miners' union has waived for the present its request for an advance in wages. The matter will come up, however, after the navigation season has closed. There is a scarcity at present of experienced miners on the Marquette range. Winter operations can be managed with the forces available, but there will be a demand for more miners when the shipping season of 1898 opens.

The first work for years at the Rolling Mill mine, on the Cascade range, was done the past season. The ore is silicious and is secured from the pit after stripping. The ore body is about 30 feet in thickness.

The season's shipments from the docks at Two Harbors will be something over 2,500,000 tons.

The Oliver mine has a record of 602,000 tons for the season.

At the Penobscot mine on the Mesabi range, preparatory work has been steadily continued during the year, until now there is proved an ore body some 200 feet deep, 500 feet wide and more than 1,000 feet long. The mine has shipped only 12,000 tons, taken out in development, all high-grade Bessemer ore, and is preparing to be a heavy shipper next year. Two 80-h. p. boilers are being added to the equipment, and the daily output of water is 3,500,000 gallons.

THE prestige which Mr. Pullman's name gave to the company bearing his name was very great, and his loss has already proved serious as affecting the temper of investors and the value of the Pullman stock. On the Monday before Mr. Pullman died Pullman stock closed at 175¼—representing a value of $63,090,000 on a capitalization of $36,000,000. Last Thursday the stock closed at 169, which represents a value of $60,804,000—a net loss of $2,286,000. As nearly half of the Pullman stock is owned in trust for charitable and benevolent organizations, and is a favorite "widow's" investment stock, such a shrinkage in value is serious. The stock has always possessed previously a record for steadiness and non-fluctuating qualities.

THE hammer shop, including the molding and blacksmithing departments of the Cumberland (Md.) Steel & Tin Plate Works, burned Nov. 7, the fire originating from a furnace. The burned building, erected over 30 years ago, was one of the original steam hammer plants in the country. Estimated loss, $10,000, insured.

CONDITION OF BLAST FURNACES OF U. S.*

Nov. 1, 1897.

Location of Furnaces.	Coke and Anthracite.					Charcoal.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity.	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New York	18	5	6330	13	6312	8	0	0	8	548
New Jersey	5	2	1891	3	1327	.....	.....	.....	.....	.....
Spiegel	3	2	514	1	100	.....	.....	.....	.....	.....
Pennsylvania:						13	1	55	12	695
Lehigh Valley	37	8	4702	29	12869	.....	.....	.....	.....	.....
Spiegel	1	0	0	1	70	.....	.....	.....	.....	.....
Schuylkill Valley	18	5	3406	13	7728	.....	.....	.....	.....	.....
Upper Susqu. Val.	5	2	2093	3	1780	.....	.....	.....	.....	.....
Lower Susqu. Val.	9	3	2706	6	3303	.....	.....	.....	.....	.....
Spiegel	1	1	363	0	0	.....	.....	.....	.....	.....
Lebanon Valley	12	4	2967	8	4484	.....	.....	.....	.....	.....
Pittsburgh	28	28	56029	0	0	.....	.....	.....	.....	.....
Spiegel	2	2	2254	0	0	.....	.....	.....	.....	.....
Shenango Valley	17	10	15148	7	4357	.....	.....	.....	.....	.....
Jun. and Con. Vals.	14	5	8523	9	4036	.....	.....	.....	.....	.....
Spiegel	1	1	543	0	0	.....	.....	.....	.....	.....
Youghiogheny Val.	3	1	1343	2	1900	.....	.....	.....	.....	.....
Miscellaneous	5	2	1981	3	1789	.....	.....	.....	.....	.....
Maryland	5	2	2750	3	2920	4	1	100	3	428
Wheeling District	9	6	7454	3	3875	.....	.....	.....	.....	.....
Ohio:						9	4	240	5	489
Mahoning Valley	11	9	14614	2	2190	.....	.....	.....	.....	.....
Central & Northern	11	10	13299	1	1008	.....	.....	.....	.....	.....
Hocking Valley	2	0	0	2	850	.....	.....	.....	.....	.....
Hanging Rock	12	4	1480	8	2035	.....	.....	.....	.....	.....
Indiana	1	0	0	1	130	.....	.....	.....	.....	.....
Illinois	16	12	23702	4	4900	.....	.....	.....	.....	.....
Spiegel	1	1	683	0	0	.....	.....	.....	.....	.....
Minnesota	1	0	0	1	629	.....	.....	.....	.....	.....
Wisconsin	4	3	3293	1	770	2	0	0	2	920
Missouri	3	1	750	2	700	1	1	375	0	0
Colorado	3	0	0	3	4620	.....	.....	.....	.....	.....
Virginia	23	10	6355	13	7062	4	0	0	4	437
Kentucky	6	2	634	4	2650	3	0	0	3	200
Alabama	39	18	18615	21	13600	12	1	248	11	2594
Michigan	.....	.....	.....	.....	.....	15	5	2495	10	3640
Tennessee	13	5	4081	8	4109	9	2	416	7	2200
Georgia	2	0	0	2	960	3	1	390	2	360
North Carolina	2	0	0	2	600	.....	.....	.....	.....	.....
New England	.....	.....	.....	.....	.....	11	2	155	9	858
Texas	.....	.....	.....	.....	.....	4	1	180	3	790
Utah	.....	.....	.....	.....	.....	1	0	0	1	175
Oregon	.....	.....	.....	.....	.....	1	0	0	1	275
Totals	342	164	208503	178	103663	97	19	4656	78	14809

SUMMARY.

Fuel.	In Blast.					Out of Blast.			
	Number.			Weekly Capacity.			Number.	Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.	
Charcoal	19	20	21	4,656	4,636	5,083	78	14,809	15,074
Coke and Anthracite	164	151	112	208,503	195,492	119,094	178	103,663	109,218
Total	183	171	133	213,159	200,128	124,177	256	118,472	224,292

*The above table is condensed from the *Iron Age*. The tables of the *American Manufacturer* show in blast Nov. 1, 185 furnaces, with 219,638 tons weekly capacity instead of 213,159 as above.

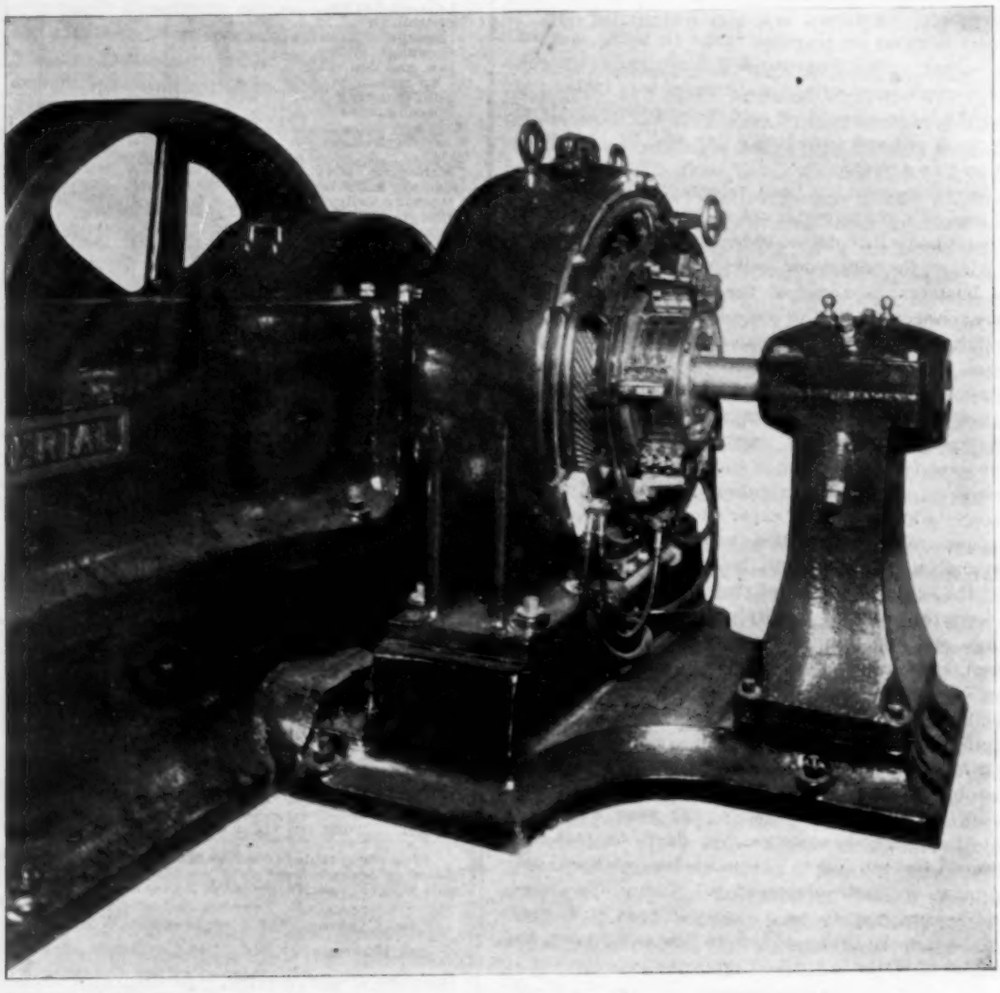
THE Clayton Air Compressor Works, Brooklyn, N. Y., offices Havemeyer Bldg., 26 Cortlandt st., New York, report that the volume of their sales for the month of October was larger than in any preceding month in the history of the business and three times greater than their average monthly sales for five years past. These works are now constructing one 25 h. p. compressor for 3,500 pounds pressure and one 50 h. p. compressor for 2,500 pounds pressure, for the Western Mfg. & Oil Co., Newark, N. J. They also have orders in hand for a compound air compressor, ordered by Fraser & Chalmers, of Chicago; a duplex air compressor for the Deane Steam Pump Co., Holyoke, Mass.; three duplex air compressors for compressed air shop plants; two air compressors for the Consolidated Pneumatic Tool Co.; one air compressor for sand blast work; one for operating pneumatic railway signals; two compressors for air lift pumping plants; two compressors to the Shone Co., of Chicago, for its pneumatic sewerage system, and one large duplex compressor for the Consolidated Gas Co., New York. This unprecedented rush of business is one indication that improved times are here.

THE Pennsylvania Steel Co. had 4,716 names on its payroll in October as against 3,602 in the same month last year and 4,652 in October, 1895, when the boom was at its height.

AN EFFICIENT DYNAMO.

The six-pole 37½ k. w. dynamo of the Fisher Electrical Mfg. Co., of Detroit, is shown in the accompanying illustration. The field magnets are laminated and fitted with pole shoes. The series and shunt coils are removable. The armature is of the bar-wound type, insulated with mica and protected from injury, and the armature conductors are held in place without the use of band wires. The commutator is carefully made, has ample wearing surfaces, which are clamped together by steel studs passing through the entire commutator frame. This prevents the commutator getting out of shape.

The brushes are carbon held securely in position by a clamping device. Operation is without any noise at the commutator. The machine illustrated, under thorough test by competent electrical engineers, worked from no load to 50 per cent overload without sparking at the brushes. The brushes are adjusted simultaneously by the hand-wheel shown on the top of the cut. The Fisher Electric Mfg. Co. is building a number of these machines for installations in Detroit and elsewhere.



THE FISHER ELECTRICAL MFG. CO.'S DYNAMO.

Casting Aluminum.—*Dingler's Polytechnisches Journal*, of Oct. 15, reviews an article by L. Ruerup in the *Chemiker-Zeitung*, in which he makes a distinction when casting aluminum, between that which requires only cleaning and polishing, and the cast ingots which are to undergo further treatment, such as hammering or rolling. The great shrinkage of aluminum requires heavy feeders to produce sound castings. The author recommends the addition of 0.1 per cent stick phosphorus to the melted aluminum after the crucible is removed from the fire. This is said to remove all shrinkage, and give castings which can be polished, but may not be rolled or forged, being both cold and red short. When rolling or forging is to be done, the author finds the following plan to be the best adapted for the purpose: The metal is melted in an iron crucible at a fairly low temperature, allowed to stand a few moments, and the surface covered with rape seed oil, which immediately produces a bright surface on the bath. As soon as the oil is burned away, the metal is poured into well heated iron ingot molds, a thin stream giving the best results, and precautions taken to fill up the pipe as the metal shrinks. In this way ingots of aluminum are obtained which answer every purpose for sheets, rods, or wire. A rod of 1¼ inch diameter thus made could be tied into several knots without showing any signs of cracking. Aluminum melted in graphite crucibles at ever so low a temperature could not come up to that obtained by the method described above, and the oftener it was remelted in graphite crucibles the worse it behaved under the hammer, the cause being probably found in the increasing percentage of silicon taken from the walls of the crucible. M.

Blast Furnace Wages Advance.

The blast furnace companies of the Mahoning Valley have posted notices announcing that a 10 per cent advance will be made Dec. 1 in the wages of blast furnace employes. The new basis will be $1.25 for common labor, instead of $1.15; $1.50 for fillers, and $1.85 for keepers. In the Shenango Valley advances have been asked by the men, ranging from 15 to 20 per cent. The wages basis in the Shenango Valley is higher than in the Mahoning Valley and the furnacemen in the former have signified their willingness to make a corresponding percentage advance, which would yield the workers a larger per diem increase than has been given in the Mahoning Valley. The matter is now in process of adjustment.

THE Uehling casting and conveying apparatus will be installed at the Eliza Furnaces of Laughlin & Co., Ltd., Pittsburg.

Allegheny Co.'s 30 furnaces are all in blast.

Review of the Technical Press.

[Translations, Condensation and Comment expressly for The Iron Trade Review by Dr. R. G. G. Moldenke.]

Carburizing Steel in the Open-Hearth Furnace.—*Engineering and Mining Journal*, Oct. 30, gives a description of an improved method of carburizing steel, taken from the *Iron and Coal Trades Review*. The addition of carbon to the bath of dephosphorized metal has the disadvantage of bringing the basic slag in contact with the carbon, which promotes the reduction of phosphorus back into the metal again. To obviate this a ring of iron coated with burnt magnesite is floated on the bath, the slag in it skimmed off, and the clean metal thus exposed sprinkled with ground coke. This is quickly absorbed, and by moving the ring about and stirring constantly, a uniform product is assured. The slag is rendered more basic by the addition of lime.

Thermal Expansion of Nickel Steel Alloys.—*Dingler's Polytechnisches Journal* of Oct. 1. reviews the work of Guillaume in determining the thermal expansion of a series of nickel steel alloys. This work was originally prompted by the discovery of abnormal coefficients of expansion in two standard nickel steel meters. Investigations were made with 17 alloys of nickel and steel in addition to bars of steel and of nickel alone. The bars were over 1 meter long each and 1 inch square. Two marks were made on each bar exactly one meter apart, and a comparison made with the standard meter in the water bath with temperatures between 32 degrees and 100 degrees F. The results were tabulated and show that up to 19 per cent metal the expansion was normal, up to 24 per cent the coefficients of expansion rise rapidly, then they drop again, being at a minimum when the nickel contents is 36 per cent. After this the coefficients gradually go back to their normal value. The modulus of elasticity of each alloy was also determined and this series was found to run in its maximum and minimum with the expansion above described. For a composition of 30 to 39 per cent nickel the average modulus of elasticity was found to be 21,334,800 lbs. per sq. inch. M.

Utilization of Tin Plate Scrap.—[*Stahl und Eisen*, Oct, 1.]—Dr. A. Harpf states that numerous patents have been taken out to utilize tin plate scrap, all of which are based upon processes to separate the tin from the iron or steel. The tin is either rubbed off mechanically, sweated off by heating, treated chemically by dissolving in caustic soda with the addition of oxidizing agents, or dissolved in acids direct and separated afterwards. Finally we have electrolytic methods for the recovery of the tin. All of these methods, according to the author, do not seem to prevent large amounts of tin plate scrap going to waste. He therefore proposes to utilize this material in the lead smelter in place of the scrap iron now added. The tin melting first would be acted upon by the sulphide of lead, finally coming down in a tin-lead-antimony alloy, which has its uses direct in the arts. Care would have to be taken to keep out all galvanized iron, for zinc would take away the silver, and is a nuisance anyhow. The whole matter would become a question of freights, for there is no technical objection to the use of the metal in this way.

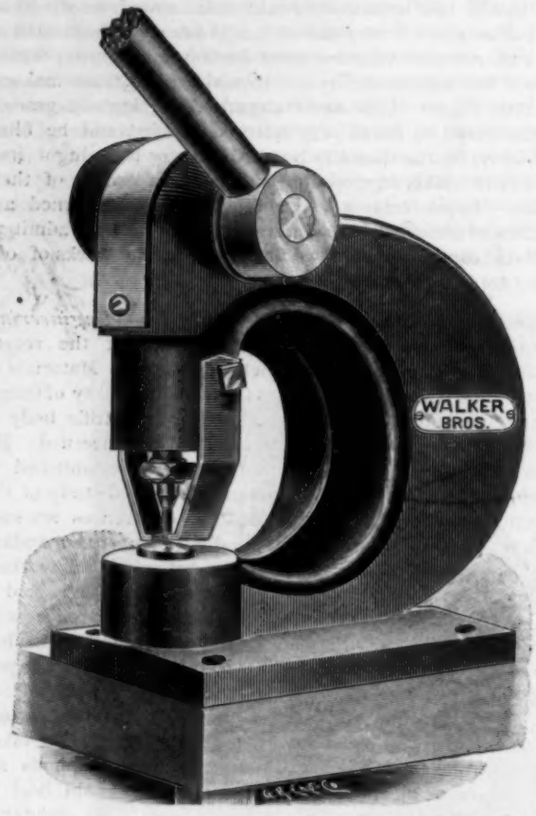
Basic Iron for Making Tool Steel.—[*Engineering Magazine, London Edition*, October.]—The editor of the department of mining and metallurgy, contributes a few remarks on the question of pure iron in the arts. He says that electrolytic iron, which is claimed to be the purest obtainable, is always contaminated with carbon from the organic acids in the solutions from which it is most readily deposited. Basic steel, or ingot iron, is really the purest material produced commercially, coming up to 99.8 per cent of iron. There certainly is a demand for pure iron, for this is shown by the high prices given for Swedes iron which is exceedingly pure from a chemical standpoint, containing, however, some mechanically mixed slag. It is further stated that good wrought iron contains about 1 per cent of slag and over, which would seem rather high from the standpoint of American practice. As ingot iron, a low carbon steel, can be brought to as low a phosphorus content as Swedish bar iron, it would be supposed that crucible steel makers prefer it. This is not the case, however, for as the editor expresses himself in conclusion: "The average maker of high-grade crucible steel is firm in the belief that there is some magic virtue in Swedish iron, and that it, and it alone, will make good steel. He will probably die with this belief. Thirty years or so hence some daring innovator may try the thing for himself, without prejudice, and find that he might have been doing it (using ingot iron) all his life to his own tangible advantage." The reviewer would remark that if the innovator would do as stated, he would be very unlikely to tell any one of it. If one were interested in steel and iron statistics, and were furthermore in a position to check the imports of Swedish iron by crucible steel makers, with their output of finished material of the highest grades, a hiatus would be found very quickly, which could be filled out readily by the specially puddled iron or pure ingot iron they buy or make, supposedly for the lower grades of their product. Improvements where the dollar is concerned are sometimes further advanced than we may care to admit to ourselves, especially when we find them in the works of our competitors.

Standard Methods of Iron Analysis.—[*Engineering Magazine, London Edition*, October.]—Anent the recent meeting of the International Society for Testing Materials of Construction, the editor discusses the probable utility of standard methods of analysis as adopted by any scientific body or society, so far as the individual chemist is concerned. He states that when the central laboratory is established in Zurich, and work therein is begun on the critical study of the analytical methods to be promulgated, differences are sure to arise which will prevent the adoption of the standard methods recommended by the society, by individual workers of note. The fact that every chemist who has become noted in some particular line is prone to resent any interference with his peculiar methods, which he, by the way, usually considers better than those of any one else, will make it difficult to persuade him to change them. Nevertheless, the work will be valuable in searching for sources of errors in the various methods in use, and pointing out the precautions to be taken to avoid or overcome them. While standard methods are doubtless desirable, the details, it is stated, should best be left to the chemist himself for the guidance of his assistants. The reviewer begs to differ from the editor in this instance, and would point out the excellent and satisfactory practice of the Pennsylvania Railroad Co., which prescribes definite methods of analysis in all their detail. Based on these, this great corporation buys all its supplies. It is rightly stated by Dr. Dudley, the eminent chief chemist in charge, that it is of less importance to have extreme accuracy to the third decimal place, when it is remembered that recognizedly correct metals will give results differing seriously in the second decimal place. It is of some importance, however, when the same method is employed by two or more chemists, that the results should tally very closely. If, therefore, a concern bids on work subject to analysis, it is very likely to use the method prescribed, which may mean the acceptance or rejection of the product in question. Suppose, now, that the large buyers adopt the methods recommended as standard by the International Society, what private chemist, testing bureau, or manufactory will be in position effectively to oppose such action, whatever it may do in its private work for its own information? It is perfectly possible, therefore, to adopt such standard methods on a promulgated, and change them only when something better is found, for nothing is perfect.

Recovery of By-Products in the Iron Industry.—*Engineering and Mining Journal*, Oct. 23, has a timely editorial on this subject, in which attention is called to the insufficient efforts given to the recovery of much of the value of the blast furnace waste products. It is stated that the Illinois Steel Co. is already engaged in the manufacture of cement from slag, and that others are planning to do the same. European practice has shown that slag cement, although not as good as Portland, can be readily used for certain classes of work. Furthermore, brick are now made from slag on the other side, and answer very well. The only instance of this application here is for the roasting stalls of some Montana smelting works. These brick being of silicious slag cannot be surpassed for this purpose. A further application of most furnace slag is for road metal, and experiments are now being made in Chicago with a view of substituting it for crushed stone.

LEVER PUNCHING MACHINE.

The accompanying cut illustrates the lever punching machines manufactured by Walker Bros., of Lansing, Mich. They are designed for the use of sheet metal workers, carriage and wagon makers, blacksmiths, tinners and others whose



work does not call for so constant a use of the machine as would justify the application of power in some form. They are the result of years of experience in the manufacture of hand punches. The makers claim that the machine combines a maximum of elements of strength, duarbility and convenience, and that it meets the need, long felt, for a good lever bench punch.

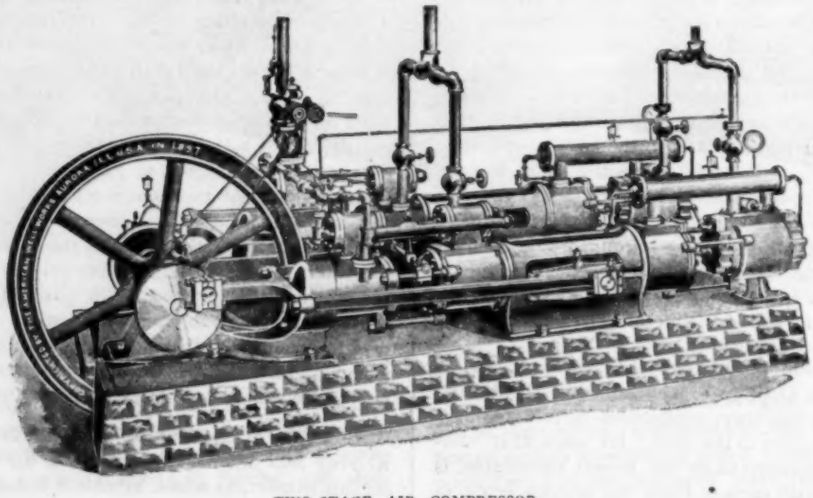
The cam is made of the best tool steel and works in long bearings. The lever may be worked from either front or back of the machine, as desired. The immense power is applied in a perpendicular direction, with no lateral strain, making operation comparatively easy on the heaviest work. No adjustment of dies is necessary, as the dies and punches are self-centering, and no time is lost in fitting up for desired changes. Details, as to prices, illustrated descriptions, etc., will be supplied by the manufacturers, Walker Bros., Box 95, Lansing, Mich., who also manufacture power punching machines.

TWO-STAGE AIR COMPRESSOR.

The illustration is from a photograph of a high duty compound steam-driven two-stage air compressor for compressing air to raise and aerate water from deep wells for city water supplies, and other purposes. Balanced steam supply valves are employed and high pressure steam is used in all of the cylinders for starting. Then the steam is shut off from the large cylinders and used expansively in the compound cylinder for continual operation. High pressure steam is used around the compound steam cylinder to maintain a uniform heat and to save the loss of power caused by condensation, as used in marine engines. Where fuel is expensive the condenser may be added for further economizing in operating expenses where fuel is expensive. The air is first compressed to a part of the pressure required; then the accumulated heat is taken out by cooling thoroughly before compressing to a higher stage. Recompressing and cooling may be continued from stage to stage until the desired pressure is reached. The amplitude of inlet valves for admitting air saves the loss suffered by expansion of air by the heat coming from frictional contact in passing through a small opening. Air can be taken from the coolest and cleanest place and conducted in a pipe to the compressor.

This engine is not to be classed with ordinary compressors used in mining and for operating quarry drills where high duty is not essential, but with the high duty pumping machinery. The Chapman air water lifting process in which the engine is employed, forces air down the central pipe to a sufficient depth in the water then up through the ejector on the lower end of the central pipe which lifts the water by its force. The air expands as it nears the top, carrying the water gradually faster and faster as it approaches the top, and being forced out with great velocity.

When it is required to bring water a long distance from a river, the duplex in-take is placed on the bank of the river, either above or below water, and pipe connections are made between the compessor and the in-take. The latter is filled by suction, and the water discharged by force to any distance or elevation. The American Well Works, of Aurora, Ill., are the manufacturers of the new compressor.



TWO-STAGE AIR COMPRESSOR.

SECRETARY W. H. SEARLES makes the following minute concerning the paper of Prof. E. W. Morley on "Visits to Some Scientific Institutions in Europe," read at the meeting of the Civil Engineers' Club of Cleveland, Oct. 18: "Prof. Morley gave a wonderfully interesting account of visits recently made to some of the noted scientific institutions of the Old World. In Berlin the Reichs-Anstallt received the most attention, a general description of the apparatus contained therein and of the nature of the work that is done there, being given. In Paris, the Sorbonne, the Society des Arts et Metiers, the International Bureau of Weights and Measures, and the laboratory of Littman, in which photographs were produced in their original colors for the benefit of the visitor were described in a charming manner. The visit to the English institutions, with a description of the apparatus, and some of the experiments now being performed in the laboratory of Lord Rayleigh, closed the paper."

THE GATLING CAST STEEL GUN.

The 6½-inch bore of the 8-inch steel gun which the Otis Steel Co., of Cleveland, cast in one piece some weeks ago, has been completed at the works of the Cleveland City Forge & Iron Co. The gun will now be bored to a diameter of 7⅝ inches. Then will follow the internal forging by compression, in which will be employed the special machinery designed by Dr. Gatling, under whose direction, as detailed in our article of Aug. 12, the contract is being carried out by the Otis Steel Works. Previous to the use of the mandrel in the final forging process the gun will be brought to a cherry red heat and after the compression it will be finally annealed.

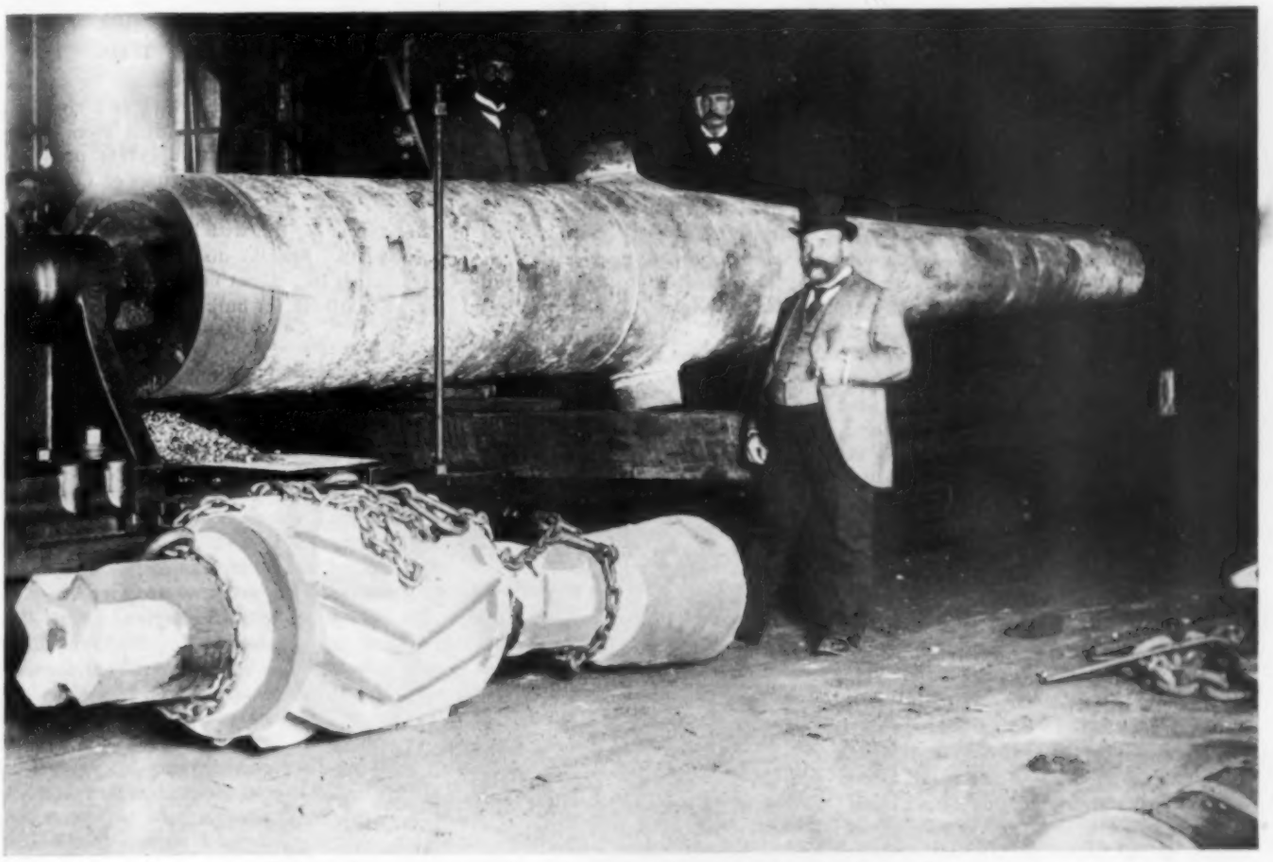


FIG. 1.—EIGHT-INCH GUN OF CAST STEEL—WEIGHT, 60,000 LBS.

In connection with the accompanying illustration which shows the first, or external, tooling to which the casting was subjected, we give a half-tone, for which we are also indebted to the *Railway Review*, of a cast steel converter bottom. This is also a product of the steel casting department of the Otis Steel Co., which has been quite busy for some months on a wide range of work calling for the best quality of open-hearth steel. The usual practice in making bottoms for Bessemer converters is to build them up of riveted plates and castings. The bottom shown is one of a lot of three turned out by the Otis Works.

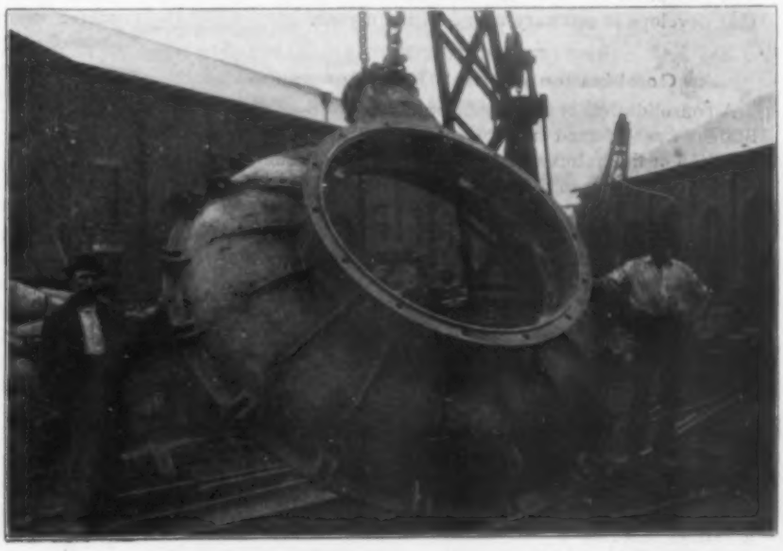


FIG. 2.—CAST STEEL CONVERTER BOTTOM.

CAR and locomotive orders, placed and prospective, are reported by the *Railway Age* as follows: The St. Louis & San Francisco has bought 200 cars, and the Illinois Central 250 cars of the St. Charles Car Co.; the Omaha, K. C. & E. has bought 13 coaches from the same company; the Norfolk & Western has bought 500 cars from the Ensign Car Mfg. Co.; the Minneapolis & St. Louis has asked for bids on 200 box cars; the Iowa Central is reported to be in the market for 2 switch engines, 4 coaches and 2 chair cars; the Grand Trunk has bought 8 locomotives of the Schenectady Locomotive Works, and 10 of the Baldwin Locomotive Works; the Schenectady Locomotive Works have an order from the Ogdensburg & Lake Champlain Road for 3 freight locomotives; the Baldwin Locomotive Works have orders from the Rio Grande Western for 4 locomotives, from the Finland State Railways for 10 passenger and 12 freight engines, from the Central Ry., of Brazil, for 16 freight and 8 passenger engines, from the Norwegian State Railway for one passenger engine, and from Cia Penoles, Mexico, for one "rack" engine.

Dr. R. G. G. Moldenke, consulting engineer of the McConway & Torley Co., and Otto C. Redman, of the Westinghouse Electric & Mfg. Co. Pittsburg, led a discussion before the Technischer Verein, Pittsburg, last week on "The Use of Motors in Small Shops."

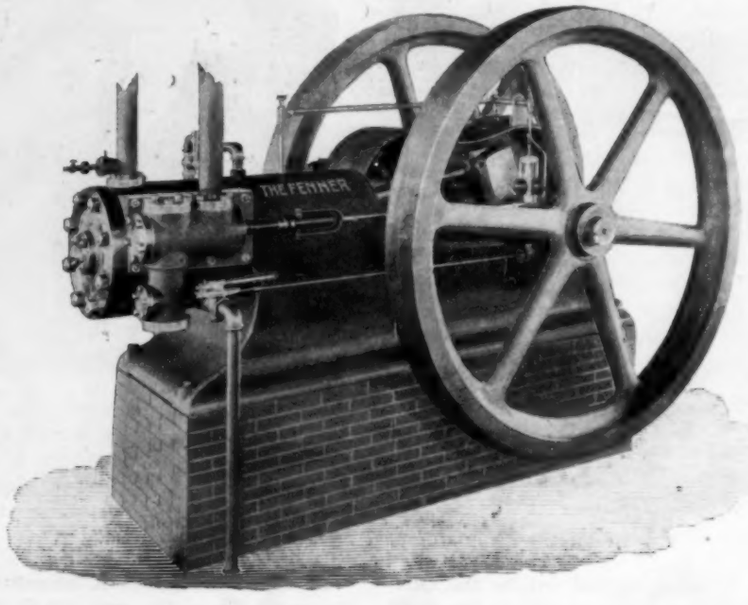
THE Reeves Anchor Mfg. Co., of Keene, N. H., has been incorporated with a capital stock of $150,000.

THE NEW FENNER GAS ENGINE.

The Fenner gas engine is named after its designer and is manufactured by the J. W. Ruger Mfg. Co., of Buffalo, the inventor having immediate supervision of the work. The essentials of an efficient gas engine—simplicity of design, accessibility of parts, economy of fuel, positive ignition and close regulation of charge—have been studiously sought after and the manufacturers, through much experimenting have satisfied themselves that these have been attained.

The engine is of the horizontal pattern, built in sizes from 5 to 40 h. p., with single cylinders, and in 50 h. p. with double cylinder. Cams, levers, etc., are avoided, with their noise. The base and cylinder of the smaller engines—those from 5 to 20 h. p.—are cast in a solid piece, giving more perfect alignment, lightness, and neatness of appearance, and taking up less floor space. Provision is made for relieving compression so that one man may readily start them. With the larger engines a special starting device is provided. A hot tube igniter is supplied ordinarily; the spark igniter is supplied when desired. A two-ball governor on an upright spindle has direct and positive control of the gas valve, graduating the charge to correspond with the load the engine is carrying and using just the amount of gas needed in the work.

Standard reamers, gauges, jigs and templates are used in manufacture, making parts of the engine interchangeable. The guarantee given by the manufacturers covers any defect that develops in ordinary usage within a year.



THE NEW FENNER GAS ENGINE.

Combination of Steel Tube Companies.

A consolidation of steel tube manufacturers of the United States was effected in Pittsburg last week by the combination of five interests which produce three-fourths of the steel tubing made in the country. The new company will be known as the Shelby Tube Co., and includes the following: The Shelby Steel Tube Co., of Shelby, O.; the Ellwood Weldless Tube Co., of Ellwood City, Pa.; the Greenville Tube Co., of Greenville, Pa., which hitherto has been practically controlled by the Ellwood Co.; the American Weldless Tube Co., and the Brewer Tube Co., both of Toledo. The latter two are smaller firms in which two of the other companies have had an interest.

The company was chartered under the laws of Pennsylvania Oct. 28, with a capital of $5,000,000. Officers were elected as follows: William E. Miller, of Elyria, O., president; W. S. Miller, of Shelby, O., treasurer; H. H. Stockley, of Shelby, O., secretary. The directors are: William E. Miller, Elyria; W. W. Skiles, B. J. Williams and W. S. Miller, of Shelby; H. A. Lozier, and N. A. Gilbert, of Cleveland, and H. W. Hartman, of Ellwood City. General offices will be established in Cleveland.

It is the intention to use American steel to a greater extent than heretofore in the manufacture of tubing. Branch offices have been established in Birmingham and London and business will be pushed for vigorously in the English market. The control of the Stiefel patents by the new company makes its position a strong one in all the markets of the world. As heretofore, the bicycle trade will be the principal customer, but the use of seamless tubes for boiler purposes is extending rapidly.

Aluminum Sheets Cheaper Than Brass.

Sheet aluminum is now cheaper than sheet brass for sheets of equal size and equal thickness. According to a circular just issued, the price of aluminum sheet in widths from 6 to 14 ins. and No. 19 or any heavier gauge, is 38 cts. per lb., with discounts of 10 and 5 per cent on quantities of 4,000 lbs. and over, making the net price 32.49 cts. per lb. The base price of sheet brass is 22 cts. per lb., with a discount, making the net price 12.1 cts. per lb. Special discounts on large lots reduce this to 11.338 cts. per lb. Sheet brass is 3.19 times as heavy as aluminum, so that bulk for bulk, or square foot for square foot of sheet of the same thickness, the price of brass as compared with aluminum would be as 11.338 x 3.19 or 36.169 cts., to 32.49 cts. for aluminum. The same circular quotes aluminum in ingots, guaranteed to be over 99 per cent pure, in ton lots at 34 cts. per lb., and nickel aluminum casting metal, which is pure aluminum alloyed with less than 10 per cent of nickel and other ingredients, 33 cts. per lb. A special casting alloy containing over 80 per cent aluminum, used in place of brass, is quoted 27 cts. per lb. These reductions in the price of aluminum are likely to increase its use in the manufacture of articles for which sheet brass has been heretofore employed.

BRAEBURN, Pa., the location of the new Braeburn Steel Co., has been made a port of entry and a bonded warehouse has been provided, in which the Swedish iron purchased by the Breaburn Steel Co., is stored until it is wanted. The warehouse is close to the mill. A deputy from the collector's office at Pittsburg will go to Braeburn and release iron from bond when desired by the company. In addition to the stocks in bond the company will carry considerable amounts of imported iron in its own warehouse.

THE American Pig Iron Storage Warrant Co.'s stock reports show the recent marketing of warrant iron for consumption. In the ten days ending Nov. 10, there was withdrawn 11,600 tons. In the same time 1,700 tons was put in yard, making total stocks Nov. 10, 251,600 tons.

BRIGHT OUTLOOK FOR THE STEEL CAR.

The 600 steel cars of 100,000 lbs. capacity built or to be built by the Schoen Pressed Steel Co., for the Pittsburg, Bessemer & Lake Erie Railroad, the 50 steel cars ordered by the Pittsburg & Lake Erie Road and the plans of the Pennsylvania Co., to build cars to carry 110,000 lbs. of coal or ore, indicate that the era of larger loads, of lower percentages of dead weight and consequently of lower costs in the transportation of heavy freight, is at hand. The *Railroad Gazette*, in writing of "The Coming of the Steel Car," says:

"Naturally the present development of very capacious cars is in steel, because, for several reasons, steel cars can be made lighter than wooden cars of the same capacity, particularly when that capacity is great. More paying load can be hauled in a train of the same gross weight. Very capacious steel cars can be built for approximately the same cost per ton of carrying capacity as wooden cars. To handle a given amount of traffic fewer cars would be required, and, for a given load, the train would be shorter. In these two facts are practical advantages which all railroad men will recognize. Less track and yard room would be required, fewer men to handle and care for the rolling stock, and other advantages, of short as compared with long trains on the road, are sufficiently obvious. Furthermore, the metal cars would be safer from destruction by fire. Beyond this it is probably true that steel cars can be so built as to reduce very greatly the maintenance account and increase in equal degree the life of the rolling stock even up to a life of 50 years under normal conditions. This statement, however, we are not yet quite ready to make without qualification. In general it is probably true; but for some reasons we are cautious about committing ourselves unqualifiedly about this. This side of the question we submit to the designers, builders, and users of steel cars for more complete discussion.

"A little analysis of comparative train weights shows some significant facts. If we assume a train of 30 steel cars with a capacity of 100,000 lbs. each, it will carry 1,500 tons of paying freight and the dead weight of the cars will be 510 tons, or a total of 2,010 tons. A train of the same gross weight, of the best standard 60,000-lb. capacity cars, would be made up of two-thirds paying load and one-third weight of cars; that is, the cars hauled would weigh 703 tons, or 193 tons more than the car weight in the steel-car train. This item alone is more than the average trainload of paying freight, counting all train mileage, on many respectable railroads. The average, for instance, on seven important representative roads from the latest official figures is 257 tons, which is considerably higher than the average of the roads of the country.

"In this example the saving in train length would be more than 500 feet, which is a very important consideration from the operating standpoint. The saving in weight only indicates a part of the saving in the cost of hauling. Increasing the number of cars in the train adds to journal friction and rolling friction and to all wearing and breakable parts. It increases the resistance on tangents and to a still greater degree on curves.

"Considering these facts, there is ample reason why those railroads which are blessed with a heavy and steady tonnage should be looking seriously into this matter of greatly increasing the carrying capacity of cars by the use of stee ."

THE Lansing Boiler & Engine Works, Lansing, Mich., which reorganized after the collapse of several local banking institutions, whose entanglements served to cripple it, is now pushing vigorously for business, with excellent prospects. The larger creditors of the company joined in the reorganization and the capital, under the new deal, is $100,000, all paid in. There has been a good run of orders recently and its force is now working overtime, difficulty being found in securing a sufficient number of boiler makers. Among recent orders are the following: Three 100-h. p. boilers for the Lansing Wheelbarrow Co.; two large boilers, stack, standpipe, etc., for the Industrial School for Boys, at Lansing; engine and boilers for the Battle Creek, Mich., Sanitarium; engine and boiler for Reading Robe & Tanning Co., Reading, Mich. A number of inquiries have been received by the company from the Pacific Coast, for a light portable saw mill, which is one of its specialties.

EDISON'S CONCENTRATING PLANT.

The success of Thos. A. Edison's persistent efforts to concentrate the lean magnetic iron ores of New Jersey and prepare them for ready utilization in the blast furnace is signalized by the giving out for publication of details of the plant at Edison, N. J., and of the processes employed. The success achieved thus far, while marvelous, the difficulties overcome being enough to stagger a man less resourceful or any less tenacious of purpose—is on the mechanical and metallurgical side of the problem, what can be done commercially, with Lake Superior ores on the extremely low basis of to-day, being a question for the future. Much depends on the capacity of the Edison plant as to the unit of cost. If 30,000 tons of briquettes were put out in a month, the interest charge alone, based on a $2,000,000 investment, would be 40 cents a ton, at 6 per cent. The cost of repairs and renewals is uncertain, but will be large. About 300 tons of 20 per cent ore can be handled per hour. Of the method pursued, the following condensation by the *Engineering News*, of various detailed accounts, gives a good idea:

The ore body worked at Edison, N. J., is about 11,000 ft. long and averages 600 ft. wide, containing, say, 200,000,000 tons. It is quarried by blasting by dynamite, 2-inch holes, 8 ft. apart, and 20 ft. deep, being drilled 12 ft. back from the working face. The ore, dislodged in blocks, some of which weigh as much as 5 tons, is loaded by a 93-ton steam shovel, built by the Vulcan Iron Works, of Toledo, into small cars or skips. These, when received in the crushing works, dump their contents onto a pair of "giant" rolls, 6 ft. diameter and 6 ft. face, set 7 ft. 3½ ins. centers, which are driven at a circumferential speed of 3,500 ft. per minute. The rolls have chilled plates bolted on them and rows of knobs, projecting 4 ins. from the plate. The rock is cracked by these rolls, and drops through them to another set of rolls, 4 ft. diameter, 5 ft. face, spaced 4 ft. 7½ ins. centers. The rock crushed by these rolls is elevated by a bucket conveyor and passed successively through two sets of rolls, each 36 ins. diameter, and a third set 24 ins. diameter.

The ore, after being reduced by the series of crushing rolls to a size of a half-inch or less, is conveyed by an elevator to a dryer which consists of a tower 9 ft. square and 50 ft. high, fitted with a series of cast iron plates placed one below the other at an angle of 45 degrees, facing alternately one way and the other. The ore slides along these plates, falling from one to the other, and is dried by the heat from a fire at the bottom. The dried ore is then elevated to a stock-house which holds 16,000 tons. From this house a conveyor takes the ore to the concentrating house, in which it is first crushed by passing twice through a stand of 3-high rolls, and it is then passed through screens of 14-mesh, placed at an angle of 45 degrees. The coarse material is taken back to the 3-high rolls and the fine is taken to the magnetic separators. These consist simply of a series of stationary magnets placed in a horizontal row, in front of which the ore is allowed to fall in a thin stream. The stream is thus divided into two, one, the concentrates, consisting of the particles rich in iron, which is diverted toward the magnets, while the other, the tailings, containing the sand, poor in iron, falls vertically. The concentrates from the first series of magnets, containing about 40 per cent of iron, are taken to a dryer, then crushed in 3-high rolls, and passed through screens of 50-mesh, the coarse material passing over the screens being returned for regrinding. The fines are then taken to another series of magnets, which deliver concentrates of about 60 per cent of iron. These concentrates are then subjected to an air blast which blows the fine dust from them, which process partially dephosphorizes the ore, since the dust is found to be richer in phosphorus than the original gangue of the ore. The dust is further treated by magnets, yielding a fine dust, which is sold for paint. The cleaned and dephosphorized concentrates, now containing 64 per cent iron, are then treated by still another series of magnets, making a final concentrate of 67 to 68 per cent iron, and tailings of 35 per cent, which are returned for regrinding and subsequent concentration.

The final concentrates are deposited in a couple of stock-houses, holding respectively 5,000 and 30,000 tons. From these houses the ore is taken to the briquetting house, in which it is first mixed with a resinous binding material in

long cylindrial mixing machines, and formed into a coherent, pasty mass, which is then compressed by the briquetting machines into briquettes 3 ins. diameter by 1½ ins. thick, weighing about 19 ounces each. The briquettes fall from the machine into conveyor bands which take them slowly through drying ovens, where they are heated to about 600 degrees F. They are thus made water-proof, hard, so as not to crumble during transportation or while passing through the upper part of the blast furnace, yet so porous as to be capable of absorbing 25 per cent of their volume of alcohol, and, therefore, easily penetrable by the gases of the blast furnace.

The capacity of the plant is 300 tons of rock per hour, one-quarter of which is made into concentrates, and the rest into crushed sand, which is valuable for building and other purposes. Running 20 hours a day the works can ship 1,500 tons of briquettes. Their composition is, iron 67 to 68 per cent; silica, 2 to 3 per cent; alumina, 0.4 to 0.8 per cent; manganese, 0.05 to 0.10 per cent; lime, magnesia and sulphur, traces; phosphorus, 0.028 to 0.033 per cent; resinous binder, 0.75 per cent; moisture, none; forming thus a blast furnace material of admirable quality. Tests made at the Crane Furnace, Catasaqua, Pa., showed that the briquettes could be used without admixture of other ores, with an increase of product of iron and a decrease of the consumption of fuel and limestone as compared with the running on the usual ore mixture.

The works and machinery, in all their details, are a marvel of mechanical engineering. The whole of the work, from the mining of the rock to the loading of the briquettes on the cars, is accomplished with the remarkably small force of 125 men per shift. The material itself is handled entirely by machinery throughout every stage of the process.

The product of the plant at Edison is expected to be placed on the market at an early date, and should trials on the large scale prove that by its use the Eastern furnaces can make iron to compete with the Western furnaces, using Lake Superior ores, a new lease of life and an enormous expansion of the Eastern iron industry is among the possibilities. Vast deposits of lean iron ores like those at Edison are to be found at many points in the Eastern States, from the Canada line to North Carolina.

The company operating the works at Edison is known as the New Jersey & Pennsylvania Concentrating Works; Thos. A. Edison, president; W. S. Mallory, vice-president; and J. F. Randolph, secretary and treasurer. The principal office is at Orange, N. J.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The Schuylkill Valley Steel Co. has been incorporated at Birdsboro, Pa., with a capital stock of $200,000, to manufacture sheet and plate steel, by George Brooke, Edward Brooke, Geo. Brooke, Jr., R. E. Brooke, of Birdsboro, Charles James, of Tacony, and Henry Potts, of Pottstown, Pa.

The Atlantic Iron Works, of Atlantic, Ia., has been formed to operate a foundry, by S. G. Hunter, M. L. Hunter, S. R. Middaugh and C. R. Middaugh.

The Becker Milling Machine Co., of New York City, has been organized to manufacture milling machines and machine tools, with a capital of $25,000. The directors are George Becker and Philip Becker, of Brooklyn, and W. J. Thompson, of New York City.

The Rapp & Speidel Iron Works, of New York City, has been incorporated with a capital stock of $30,000. The directors are Julian M. Pinkney, Brooklyn; Hugo S. Speidel and John Van Buskirk Rapp, of New York City.

The Salem Iron Works, Salem, N. C , will probably be in the market for five-inch or six-inch shafting, couplings and hangers; also smaller sizes—second-hand preferred.

Wm. Fitz Simmons, Cordele, Ga., is in the market for boiler and engine, machine shop and foundry equipment. Second-hand outfit will answer.

New Construction:—

Bids have been invited by the American Steel Barge Co., West Superior, Wis , upon the construction of the new machine shops, which will be put in as an addition to the present plant. The plans as drawn provide for a building, either 120x85 feet or 150x85 feet. The new machine shop will be of brick, stone and steel, with trussed roof and all modern machinery. The cost of the building alone will be something like $20,000. The machinery with which it will be equipped will cost a large amount more, and the shops will give steady employment to a large number of skilled men.

John M. Dougall & Co., of Montreal, Can., are rebuilding their St. Francis furnace, which was damaged by fire a year ago.

The Pfandler Vacuum Fermentation Co., Detroit, Mich., will build a two-story machine shop, 12x138 feet in size.

The Western Malleable Iron & Foundry Co. has submitted plans for its new plant at Milwaukee to the building inspector. It is proposed to build a plant 72x200 feet, to cost $12,000.

The Portage Iron Co., of Duncansville, Pa., has broken ground for a nail plant, with a daily output of 1,000 kegs. The main building will be 60x250 ft., with two wings, 25x20 ft., and a boiler house. The new hoop mill will be completed in early spring.

The National Wrought Iron Annealing Box Co., whose plant at Anderson Ind., burned, is erecting a larger plant, having secured ground 100x400 feet. The main building will be 40x84 feet, with an L 30x40 feet.

Work on the new continuous mill of the Union Iron Steel Co., at Youngstown, O., which will be the second to be erected by this company, is going on rapidly. The equipment will be of the most advanced type and a large output will be made.

A. D. Baker & Co., Scranton, Pa., will build a foundry next season and enter into the manufacture of threshing engines.

At New Castle, Pa., a bonus of $4,000 has been raised for Pittsburg and other capitalists who propose building a tin plate mill on the Sample farm, between New Castle and Mahoningtown. The American Axe & Tool Co., has secured an option on 18 acres ajoining, for the purpose of erecting a plant.

Negotiations have been concluded for the sale of the property of John Robson & Son, chain manufacturers, Pittsburg, to the Pennsylvania Tube Works Co., whose large plant adjoins the Robson works. The Pennsylvania Tube Works Co. will erect on the newly acquired propery an immense warehouse for storing products prior to shipment. More room was necessary on account of largely increasing business.

At Birmingham, Ala., Ike Adler and associates have organized the Southern Iron & Steel Co., with a capital stock of $25,000, and will erect a plant for general foundry and casting work. It will employ 50 hands.

The Youngstown (O.) Bridge Co., whose shops burned in October, has begun the construction of new buildings calculated to be the most complete bridge shops in the country. The main building will be 80x800 ft., and two of the other buildings will be 80x150 ft. and 80x100 ft. respectively. They will be constructed of steel throughout, and the contract for the steel work has been awarded to the Shiffler Bridge Co., Pittsburg.

The Ferguson Tin Plate Co., of East Liberty, Pittsburg, is reported to have secured a tract of land near Uniontown, Pa., and it offers to build a new town with a new tin plate plant as the chief industry if citizens of Uniontown will buy $125,000 worth of its lots. The present plant of the company is too small and it wants to add a bar mill.

Additions, Enlargements, Removals, Etc.:—

The Betts Machine Co., of Wilmington, Del., will enlarge its plant by the addition of a two story brick and iron building, 40x60 feet.

Gustafson Bros., Sequachee, Tenn., are making improvements to their foundry, adding new machinery, and increasing the capacity of the cupola.

The Alabama Foundry & Machine Works, New Decatur, Ala., will double their capital stock and enlarge their plant and operations.

The Shiffler Bridge Co., of Pittsburg, has the contract for the extension to the building of the Laughlin Nail Co., at Martin's Ferry, O., to accommodate the addition to its tin plate plant which that firm has under construction.

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HARRISON SAFETY BOILER WORKS PHILADA. PA
MANUFACTURERS.
FOR PURIFYING EXHAUST STEAM
FOR TAKING WATER OUT OF STEAM.
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The Atlanta Steel & Tin Plate Co., of Atlanta, Ind., will double the capacity of the plant, which has three hot mills at present. When the improvement is completed, it will manufacture 2,800 boxes of tin plate per week, and the monthly pay roll will be increased from $10,000 to $20,000.

Contracts have been let by the Gates Iron Works, Chicago, for a notable addition to its plant for the manufacture of mining machinery. It will be built as an extension of the present machine shop, adjoining it on the south. Its size will be 90x340 feet, or double that of the old shop. The wall of the latter was built of tile, and when the new shop is completed this will be removed, throwing the whole structure into one inclosure. The building is to have no imflammable materials in it, but will be composed of steel, brick and other non-combustibles. The enlargement of the machine shop will require the installation of a number of new machine tools. The equipment is to be of the most modern character, with the best facilities for handling heavy masses. The demand for mining machinery has been very heavy for some time, in addition to which the company is establishing an important business in building high speed engines for electric work.

Fires and Accidents:—

The loss to the Baltimore Malleable Iron & Steel Casting Co. by fire, Nov. 5, in its plant at Baltimore, Md., will be about total as regards insurance, which is as follows: German Fire, $4,666; Home, of Baltimore, $4,666; New Hampshire, of Manchester, N. H., $4,666.

Fire starting in the foundry department of the Middlesboro, Ky., Foundry & Machine Works, completely destroyed the entire plant on Nov. 10. The building was valued at $110,000, and the machinery contained in it at several hundred thousand dollars. No fire protection was provided, and nothing could be done to save the property. The plant was owned and operated by English interests, and had been running about a year. The insurance is $100,000.

The foundry of Patrick Kennedy, at Baltimore, was damaged $5,000 by fire.

General Industrial Notes:—

Recent sales and shipments of the Cochrane separators made by the Harrison Safety Boiler Works, Philadelphia, are as follows: Adams, Green & Co., Chicago, 4-inch and 5-inch; F. M. & T. D. Shaw Co., Medford, Wis., 3-inch; Hotel Lafayette, Philadelphia, 7-inch; Baxter, Schenkelberger & Co., Boston, 3 one-half inch; York Mfg. Co., Saco, Mo., 5-inch; Thos. Emery's Son, Cincinnati, 6-inch; H. B. Pancoast & Co., Philadelphia, 2-inch; M. J. Daly, Waterbury, Conn., 6-inch; Massillon State Hospital, Massillon, O., 3-inch; R. Gray, Jr., Newark, N. J., 6-inch; St. James' Bldg., New York, 10-inch; Cochrane Chemical Co., Boston, 3 one-half inch, two 5-inch and one 2-inch; Newark & South Orange Ry., Newark, N. J., four 7-inch; Baker, Smith & Co., New York, 2-inch; Ball Engine Co., Galveston, Tex., 8-inch; Union Club, Boston, 6-inch; Manhattan Oil Co., Welker, O., two 3-inch and two 4-inch; J. H. McGowan Co., Cincinnati, O., two 4-inch; Brown School, Hartford, Conn., 3-inch; Geo. I. Roberts & Bro., New York, 6-inch; Colorado Smelting & Mining Co., Butte, Mont., 8-inch; A. B. Franklin, Boston, Mass., 4-inch and 5-inch; Parker Mills, Fall River, Mass., 5-inch; Delancey & Co., Philadelphia, 5-inch; Advance Packing & Supply Co., Chicago, Ill., 6-inch; Consolidated Steel & Wire Co., Rankin Station, Pa., 4 inch, 9-inch, two 10-inch and one 12-inch; Pope Tube Co., Hartford, Conn., ¾-inch, 1½-inch, 2-inch, and two 2½-inch; Springfield Boiler & Mfg. Co., Springfield, Ill., 7-inch; Edison Lamp Works, Harrison, N. J., 12-inch; H. N. Plimpton & Co., Norwood, Mass., two 2-inch; Thornton N. Motley & Co., New York, 5-inch; Crane-Churchill Co., Omaha, Neb., 3-inch, 5-inch and 8-inch; Edison Electric Illuminating Co., Boston, 6-inch; National Tube Works, McKeesport, Pa., 12-inch and 8-inch: Westinghouse, Church, Kerr & Co., Boston, 4-inch, 5-inch and 6-inch; Best, Fox & Co., Pittsburg, Pa., two 5-inch; Chicago General Railway Co., Chicago, 7-inch; Pacific Mills, Lawrence, Mass., 5-inch; Potter & Watson, Boston, 5-inch; Landers, Frary & Clark, New Britain, Conn., 10-inch; Morrell Jewell Bldg., Boston, 10-inch; Fred. W. Wolf Co., Chicago, two 2-inch; M. J. O'Donnell & Co., Cleveland, 2½-inch; Stevens Mfg. Co., Fall River, Mass., 14-inch; McMullen Woven Wire Fence Co., Evanston, Ill., 2½-inch, 3-inch, 4-inch and 5-inch; Mrs. Ames, green-house, N. Easton, Mass., 2-inch; Jos. Darlington, Philadelphia, 5-inch; Johnson & Morris, New York, 3-inch; Young & Smylie, Brooklyn, N. Y., 6-inch; John A. Dialogue & Son, Camden, N. J., 5-inch and 7-inch; Danvers Bleachery Co., Peabody, Mass., 3-inch; Lewiston Bleachery & Dye Works, Lewiston, Me., 2-inch; Tatham & Bros., Philadelphia, 1-inch; Reichard & Pattee, Minneapolis, Minn., 2½-inch; S. R. Snow, Mankato, Minn., 2½-inch; John M. Stearns & Co., New York, 8-inch; John M. Stearns & Co., Petersburg, Va., 8-inch; Hunter & Dickson, Philadelphia, 6-inch, etc.

The plant of the J. I. Case Threshing Machine Co., at Racine, Wis., is being thoroughly overhauled by the new owners. It will be put in operation in December, and it is expected that next year's output will be the heaviest in the history of the works. Reports are current that other lines of manufacturing are to be undertaken in addition to those hitherto followed.

The Bethlehem Iron Co., Bethlehem, Pa., has declared a semi-annual dividend of 4 per cent, amounting to $200,000. The net earnings for the six months ending September 30 are said to have exceeded $600,000.

The Thomas Iron Co.'s blast furnace, at Hellertown, three miles from South Bethlehem, Pa., which has been idle for the last two years, will resume operations immediately.

The Crozer Iron Co., Roanoke, Va., has recently blown in its stack No. 2.

The Lawrence Furnace of the John Peters Iron Co., Ironton, O., is about ready to start up.

The furnaces of the new skelp mill of the Reading Iron Co., Reading, Pa., have started up.

During the month of October the Chicago Pneumatic Tool Co. received cable orders from Europe for a total of 56 machines for hammers, drills and riveters, in addition to receiving a number of most flattering letters testifying to the satisfaction which its tools are giving over there. The company has in the last 30 days about doubled its manufacturing ca-

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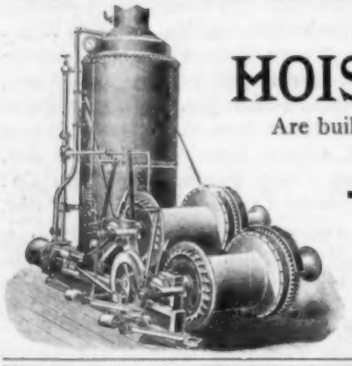

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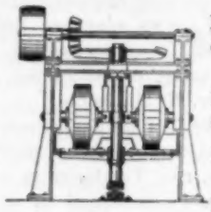

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pacity, and is still (as it has been since March last) running day and night. New machines which the company are now putting on the market for rolling and expanding flues promise to effect a great saving in the cost of doing that class of work.

The Phoenix Iron Works Co., Meadville, Pa., has secured a contract for the exclusive right to manufacture and sell the Moyes patent combined safety tube boiler.

At a special meeting of the directors of the Pullman Co., Nov. 11, R. T. Lincoln was elected director to fill the vacancy made by the death of G. M. Pullman. There was also elected an executive committee of three, namely, Marshall Field, H. T. Humbert, and Robt. T. Lincoln, of which Mr. Lincoln was made chairman. He was also appointed acting president of the company, the election of a president being postponed temporarily.

At Birmingham, Ala., the Alabama Bridge & Boiler Works, now operating a plant, has been incorporated with capital stock of $25,000, by W. M. Nalls, J. D. Moore and J. H. McCune.

The Georgia Mining, Manufacturing & Investment Co., Rising Fawn, Ga., has organized under the name of the Southern Mining Co. F. H. Connor, of Chattanooga, is general manager. The company is now operating the ore mines at Rising Fawn, and expects to put the furnace in blast.

The Watts Steel & Iron Syndicate, Middlesborough, Ky., is reported to be preparing its furnaces and steel works for operation. The steel works have never been in operation. The report is doubted.

The Colorado Fuel & Iron Co., President Osgood states, is doing a good business in coal and coke. There is a market for all the iron production of the company and it will be necessary to increase the output to meet the demand. The railroads in Colorado are all doing a large business. The company's earnings so far this year are under those of last year, because the returns from the steel rail business are much less, the prices being $6 or $7 less than last year's, with the pool out of existence.

The City of Hannibal, Mo., has ordered from the Murray Iron Works Co., of Burlington, Ia., a Sioux Corliss engine of 450 h. p. This is to be installed alongside an engine of similar pattern that has been in continuous operation for some years, the intention being to sell power.

Among recent sales and shipments of the Cochrane heaters, made by the Harrison Safety Boiler Works, Philadelphia, are the following: L. J. Mueller Furnace Co., Milwaukee, Wis., 200 h. p.; McCormick Harvesting Machine Co., Chicago, 1,000 h. p.; Leader Bldg., 250 h. p., special; Whitehead & Hoag Co., Newark N. J., 200 h. p. special; Chicago General

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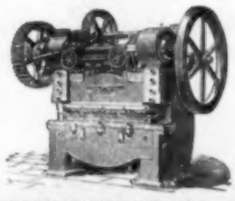

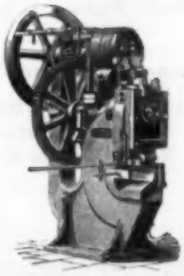

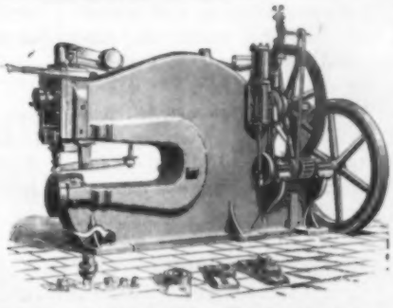

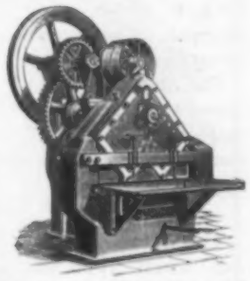

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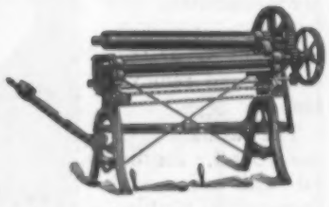

Railway Co., 500 h. p; Geo. W. Newcome, Sachse, Tex., 50 h. p.; Marion Brick Works, Marion, Ind., 350 h. p.; Consolidated Steel & Wire Co., Rankin Station, Pa., two 3,000 h. p.; Henry Kreamer, Nazareth, Pa., 100 h. p.; Solar Electric Co., Brookville, Pa., 200 h. p., special; Nazareth (Pa.) Mfg. Co., 50 h. p.; Public Baths Asso. Philadelphia, 50 h. p., special; H. W. Johns Mfg. Co., Chicago, 250 h. p.; American Blower Co., Detroit, Mich., 75 h. p., special; Monongahela Furnaces, McKeesport, Pa., 1,500 h. p.; J. S. Farrell & Co., Indianapolis, Ind., 200 h. p.; McMullin Woven Wire Fence Co., Evanston, Ill., 200 h. p.; Ridgewood Engine House, Brooklyn, N. Y., two 350 h. p.; Superior Steel Co., Carnegie, Pa., 300 h. p.; F. J. Kress Box Co., Pittsburg, 50 h. p.; Chicago (Ill.) Stamping Co., 200 h. p., special; Herpolsheimer & Co., Lincoln, Neb., 100 h. p.; Hotel Dennis, Atlantic City, N. J., 150 h. p., special; Ellwood Tin Plate Co., Ellwood City, Pa., 850 h. p.; Albright's Sons & Co., Allentown, Pa., 100 h. p., special, and 300 h. p., special, etc.

At a meeting of the board of directors of the Michigan-Peninsular Car Co., held in Chicago, Nov. 9, a dividend of 1 per cent was declared payable Nov. 17 at the office of the Guaranty Trust Co., New York. An officer of the company says it is doing much better business than in the corresponding time last year. The profits are small but are obtained from such low prices that they are regarded as likely to increase with improvement in general business. The company is expecting heavy orders from railroads this winter. The enormous traffic which the roads have enjoyed since early fall is very wearing on cars. In the car manufacturing business it is especially true that a surfeit of business carries with it maximum prices. The company has $5,000,000 8 per cent cumulative preferred stock. It kept up the dividends on this capital to September, 1893; since that time it paid 1 per cent in 1895 and 4 per cent in 1896. This leaves an accumulation of 2 per cent in 1893, 8 per cent in 1894, 7 per cent in 1895, 4 per cent in 1896 and 6 per cent for three-quarters of 1897, making a total of 27 per cent accrued, or $1,350,000.

Many employes at the Bellaire Steel Works, refused to go out on the call of the local trade and labor assembly, the latter giving them the alternative of being branded as non-union and scabs. In one department the men voted five to one to remain in.

A cargo of water pipe is being loaded at Philadelphia for shipment to Auckland, N. Z.

The Bethlehem Iron Co. is reported to have sold the blast furnace at Bingen, Pa., which has been idle for a number of years, to Poulterer & Co., junk dealers, of Philadelphia.

The Baldwin Locomotive Works have just taken an order

for 24 locomotives for Brazil and 22 for Finland, and 10 for the Grand Trunk of Canada, besides orders for American roads.

One furnace of the Andrews & Hitchcock Iron Co., at Hubbard, O, is producing upwards of 200 tons a day, while No. 2 furnace is being fitted up and will probably go in blast Dec. 1.

Mary Furnace of the Ohio Iron & Steel Co., at Lowellville, O., is turning out nearly 1,700 tons of iron a week. This week the furnace changed to foundry iron, to replenish its stock of Mary Ohio Scotch iron. Recently a new 500 h. p. Wheeler boiler was put in, together with a new pump with a capacity of 3,000,000 gallons. More boilers will be installed soon and the water equipment will then be in fine shape. Ore and coke bins have been built so that cars are now unloaded without shoveling.

The Wrought Iron Bridge Co., of Canton, O., a second time secured a verdict in common pleas court of Tuscarawas County, O., against James B. Clow & Son, of New Philadelphia, O. Suit was brought originally to recover for structural iron furnished the defendant company. Payment was refused on account of alleged delay in delivery of material. A verdict was found for the plaintiff. The case was carried to circuit court, the decision of the lower court reversed and the suit remanded to common pleas for retrial. The result was a second verdict for the full amount claimed, over $15,000.

At Sharpsville Pa., employes of Alice Furnace, operated by Pickands, Mather & Co., struck for the reinstatement of one of the scale bosses. The latter were getting $1.35 and asked for $1.60, which was granted, but one of the bosses was discharged. The furnace was shoveled out Nov. 14, indications being that the strike would continue.

The Aetna-Standard Iron & Steel Co., Bridgeport, O., has leased the Jefferson Iron Works furnace, at Steubenville, and will operate it in addition to the two furnaces at Mingo Junction. The idle furnace at Mingo is being put in shape to run.

The new bar mill constructed by the American Tin Plate Co., Ellwood, Ind., at a cost of $100,000, has been put in operation and the first bars ever made in Central Indiana have been manufactured.

Application for a charter has been made by P. L. Kimberly, R. S. Henderson, G. A. Baird, William S. Roberts, and Alexis W. Thompson, to incorporate the P. L. Kimberly Co., of Sharon, Pa., to manufacture iron and steel. The new company will take over the Kimberly and connected properties.

The nine furnaces now active in the Mahoning Valley are producing iron at the rate of 14,500 tons a week.

Struthers O., Furnace is making a very regular output of excellent iron, averaging at present about 240 tons a day.

The Struthers, (O.) Iron & Steel Co. is running quite full, with orders for black and galvanized sheets that will occupy it for many weeks ahead. The new galvanizing department is particularly busy.

Sales and shipments of the Elk Rapids Iron Co.'s product by the Superior Charcoal Iron Co., in the week ending Nov. 2 are put at 5,000 tons. The daily output is close to 90 tons. The chemical plant of the company, recently burned, will be rebuilt by Jan. 1.

The plant for the recutting and repunching of old steel rails at Wheatland, Pa., was to have started up early in the month, but failed to do so, some of the machinery being found defective. The plant will go on double turn as soon as repairs can be made, several good orders being on the books.

The Wheeling Iron & Steel Co., operating furnaces and steel works at Benwood, W. Va., has announced an increase of 10 per cent in wages.

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Also Towing Launches built by Marine Iron Works, Clybourn and Southport avenues, Chicago. Free illustrated catalogue. Write them for it.—*Adv.*

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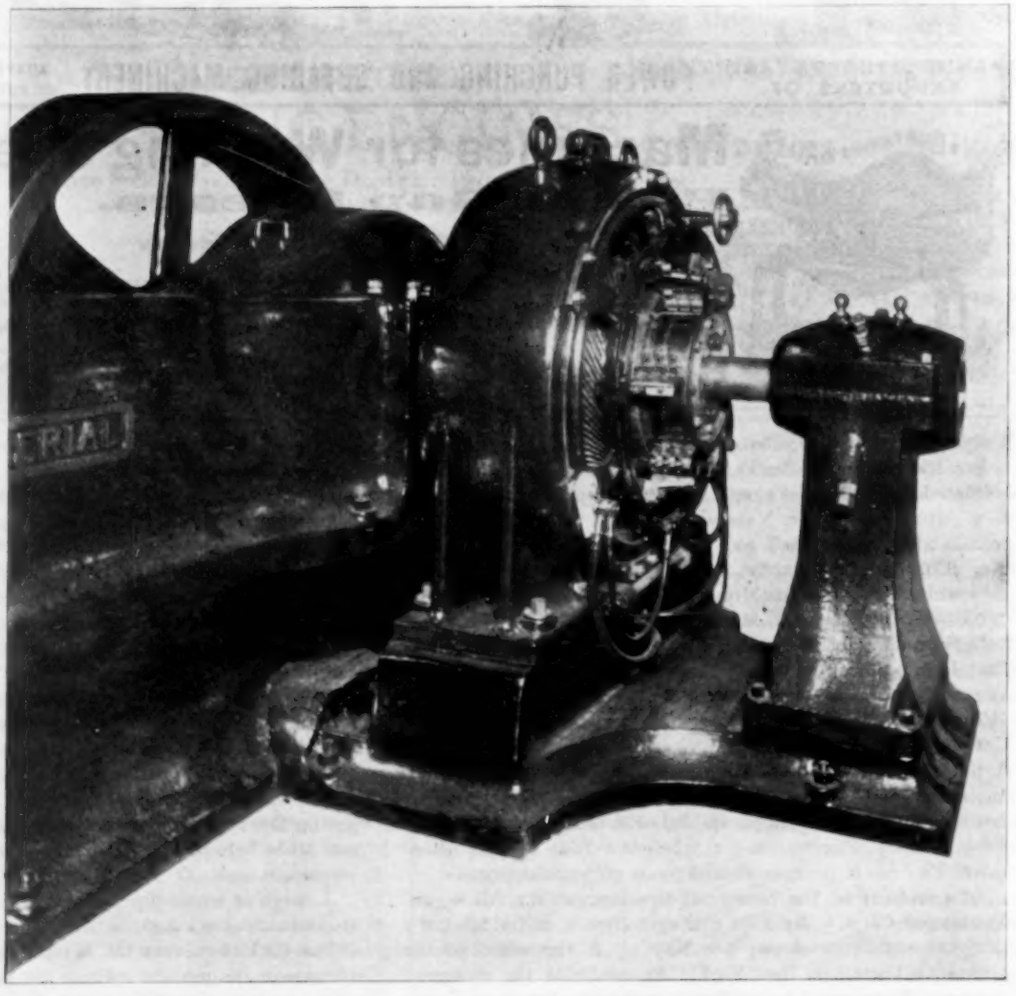

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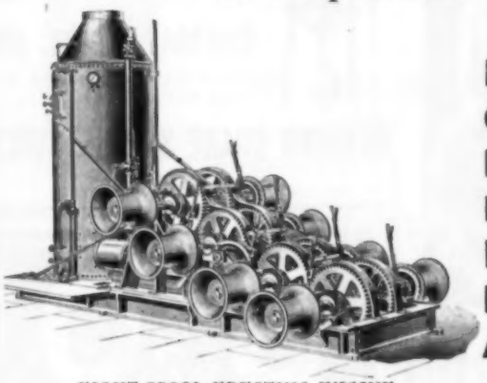

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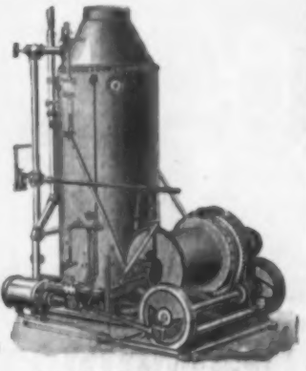

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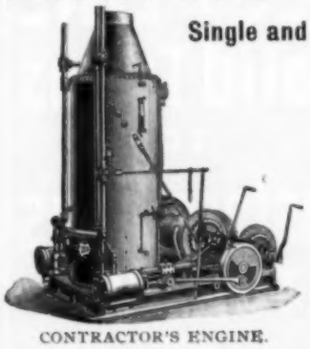
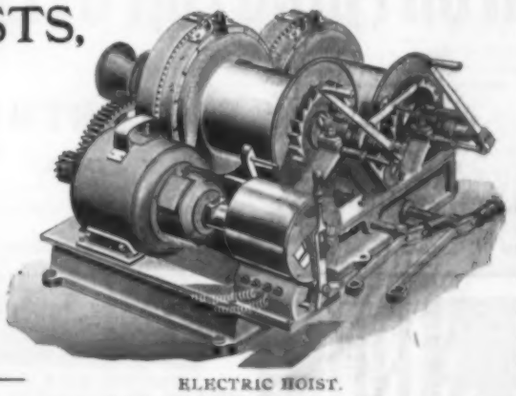
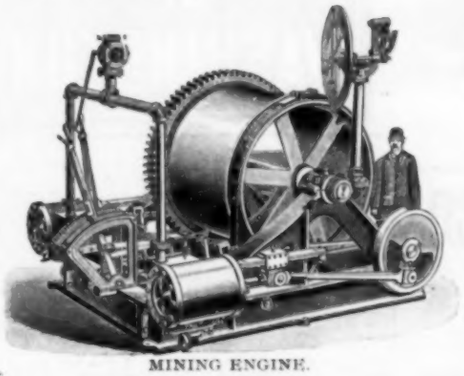


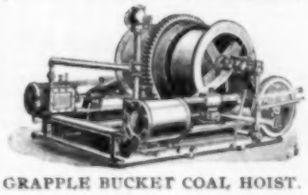
CONTRACTOR'S ENGINE.



ELECTRIC HOIST.



MINING ENGINE.



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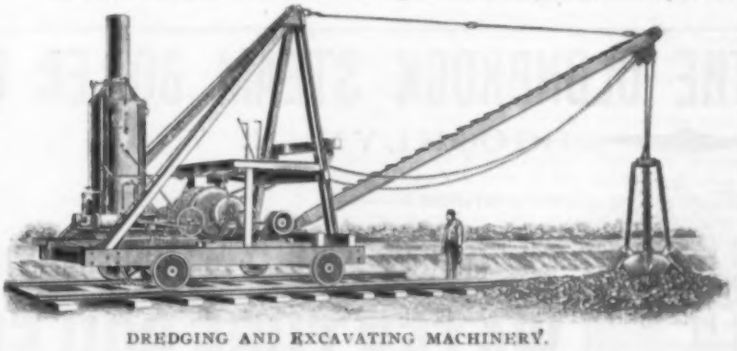

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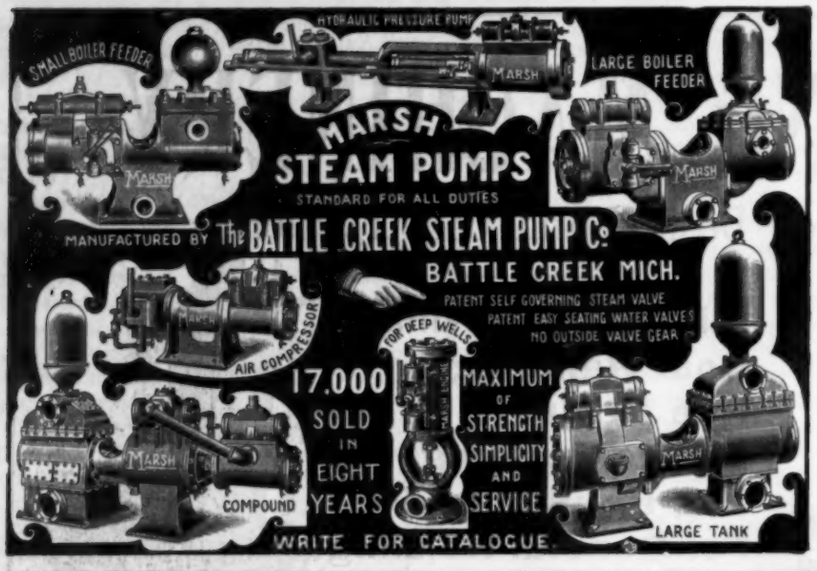

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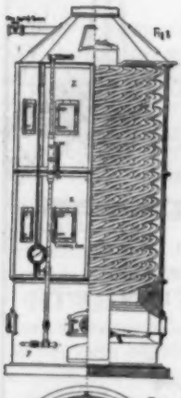

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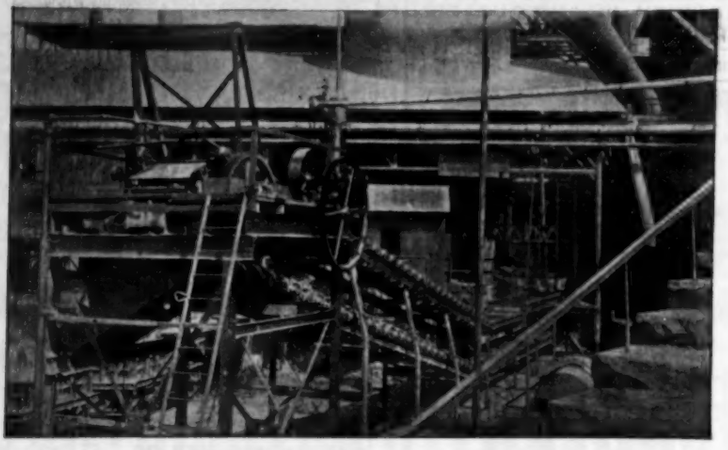

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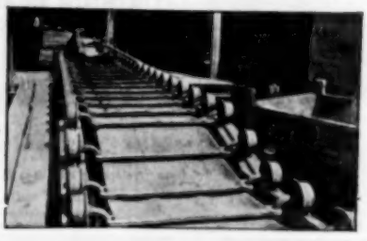

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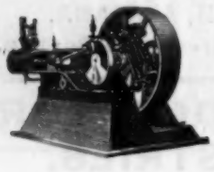

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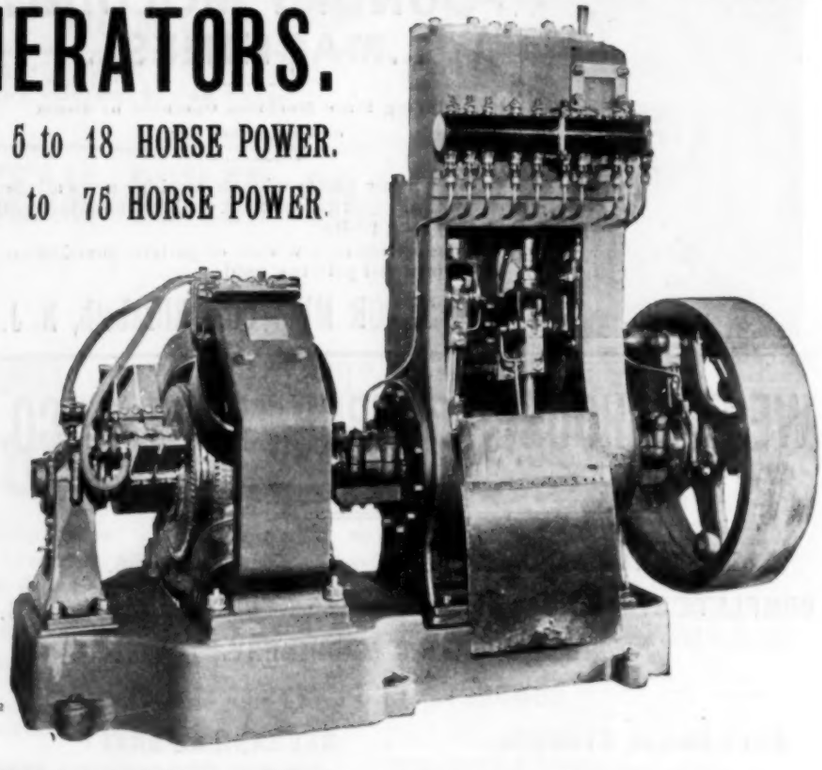

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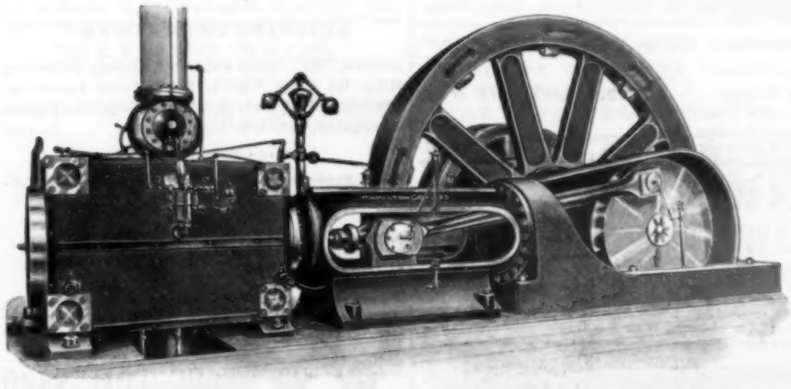

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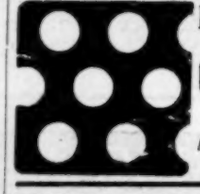

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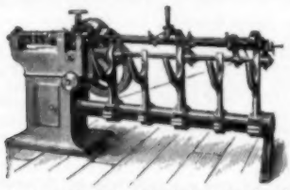
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Sykes Iron & Steel Roofing Co., Niles, O.
Berger Mfg. Co., Canton, O.
Ætna-Standard Iron & Steel Co., Bridgeport, O.

Iron Ore—
Lake Superior Consolidated Iron Mines New York City, N. Y.
Oglebay, Norton & Co., Cleveland, O.
Pickands, Brown & Co., Chicago, Ill.
M. A. Hanna & Co., Cleveland, O.
Chas. F. Rand, Prest., New York City.

Iron Working Tools—
Toledo Machine & Tool Co., Toledo, O.
H. Bickford, Lakeport, N. H.
Lodge & Shipley Machine Tool Co., Cincinnati.
C. H. Besly & Co., Chicago, Ill.
John Adt & Son, New Haven, Conn.
U. Baird Machinery Co., Pittsburg, Pa.
Edwin Harrington Son & Co., Philadelphia
Dietz, Schumacher & Boye, Cincinnati, O
Wm. Glader, Chicago, Ill.
Fox Machine Co., Grand Rapids, Mich.
Wm. C. Thayer, Cleveland, O.

Link Belting—
The Jeffrey Mfg. Co., Columbus, O.
Link-Belt Machinery Co., Chicago, Ill
Heyl & Patterson, Pittsburg, Pa.

Lathes—
Lodge & Shipley Machine Tool Co., Cincinnati
U. Baird Machinery Co., Pittsburg, Pa.
Edwin Harrington, Son & Co., Philadelphia.
Dietz, Schumacher & Boye, Cincinnati, O.
Wm. Glader, Chicago, Ill.

Lubricators—
The Lunkenheimer Co., Cincinnati, O

Machinists' Tools and Supplies—
H. Bickford, Lakeport, N. H.
C. H. Besly & Co., Chicago, Ill.
U. Baird Machinery Co., Pittsburg, Pa.
Bertsch & Co., Cambridge City, Ind.
Lodge & Shipley Machine Tool Co., Cincinnati.
Dietz, Schumacher & Boye, Cincinnati, O.
Wm. Glader, Chicago, Ill.

Machine Screws—
C. H. Besly & Co., Chicago, Ill.

Machine Shops—
Toledo Machine & Tool Co., Toledo, O
The R. D. Nuttall Co., Allegheny, Pa.
The Lane & Bodley Co., Cincinnati, O.

Machinery and Tool Steel—
W. H. Bosworth, Cleveland, O.

Magnesia Covering—
C. H. Besly & Co., Chicago, Ill

Manufactured Iron & Steel—
Bourne-Fuller & Co., Cleveland, O.
Cleveland Rolling Mill Co., Cleveland, O.
Cambria Iron Co., Johnstown, Pa.
Junction Iron & Steel Co., Mingo Junction, O.
Ætna-Standard Iron & Steel Co., Bridgeport, O.

Metal Bearings—
North American Metaline Co., Long Island City, N. Y.

Metal Stamping—
Oliver P. Clay Co., Cleveland, O.

Milling Machines—
Lodge & Shipley Machine Tool Co., Cincinnati.
U. Baird Machinery Co., Pittsburg, Pa.
Fox Machine Co., Grand Rapids, Mich.

Mining Machinery—
The Bucyrus Co., South Milwaukee, Wis.
C. H. Besly & Co., Chicago, Ill.
The Edward P. Allis Co., Milwaukee, Wis.
Earle C. Bacon, New York City.
The Lane & Bodley Co., Cincinnati, O.
Gates Iron Works, Chicago, Ill.
W. H. Bosworth, Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
Lidgerwood Mfg. Co., New York City.

Motors—
Westinghouse, Church, Kerr & Co., New York City.
Westinghouse Electric & Mfg. Co., Pittsburg.
Card Electric Co., Mansfield, O.
Fisher Electrical Mfg. Co., Detroit, Mich.

Molding Machines—
Tabor Mfg. Co., Elizabeth, N. J.

Molding Sand—
Ohio Sand Co., Conneaut, O.

Oilless Bearings—
North American Metaline Co., Long Island, City, N. Y.

Oil Burners—
W. S. Rockwell & Co., New York City.

Oil Cups—
C. H. Besly & Co., Chicago, Ill.
The Lunkenheimer Co., Cincinnati, O.

Oil Pumps—
C. H. Besly & Co., Chicago, Ill.
The Lunkenheimer Co., Cincinnati, O.

Ore Crushers—
The Edward P. Allis Co., Milwaukee, Wis.
Gates Iron Works, Chicago, Ill.
Jeffrey Mfg. Co., Columbus, O.

Ore Screens—
A. J. Beckley & Co., Garwood, N. J.

Packing—
C. H. Besly & Co., Chicago, Ill.
Jenkins Bros., New York City.

Paint—
Iron Clad Paint Co., Cleveland.
Jos. Dixon Crucible Co., Jersey City, N. J.

Pattern Works—
Gobeille Pattern Co., Cleveland, O.

Perforated Sheet Metal—
Harrington & King Perforating Co., Chicago, Ill
Aitchison Perforated Metal Co., Chicago.
A. J. Beckley & Co., Garwood, N. J.

Phosphor Bronze Castings—
Nolte Brass Co., Springfield, O.
Lorain Foundry Co., Lorain, O

Pig Iron—
Pickands, Brown & Co., Chicago, Ill.
Clinton Iron & Steel Co., Pittsburg.
Forster, Waterbury & Co., Chicago, Ill
W. H. Bosworth, Cleveland, O.
Bourne-Fuller Co. Cleveland, O.
M. A. Hanna & Co., Cleveland, O.
E. H. Stroud & Co., Chicago, Ill
Miller, Wagoner & Bentley, Chicago, Ill.
Rogers, Brown & Co., Cincinnati, O.

Pipe Covering—
C. H. Besly & Co., Chicago, Ill.

Pipe
W. H. Bosworth, Cleveland, O.

Planers—
Lodge & Shipley Machine Tool Co., Cincinnati.
U. Baird Machinery Co., Pittsburg, Pa.

Plates—
Enterprise Boiler Co., Youngstown, O.

Plumbers' and Gas Fitters' Supplies—
C. H. Besly & Co., Chicago, Ill.

Pneumatic Appliances—
Clayton Air Compressor Works, New York.

Portable Forges—
C. H. Besly & Co., Chicago, Ill.
B. F. Sturtevant Co., Boston, Mass.

Power Presses—
Bertsch & Co., Cambridge City, Ind.
Long & Allstattar Co., Hamilton, O.
Perkins Machine Co., Boston, Mass.

Power Transmission Machinery—
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.
Jeffrey Mfg. Co., Columbus, O.
The Lane & Bodley Co., Cincinnati, O.

Presses—
Toledo Machine & Tool Co., Toledo, O
Bertsch & Co., Cambridge City, Ind.
C. H. Besly & Co., Chicago, Ill.
Long & Allstatter Co., Hamilton, O.
Perkins Machine Co., Boston, Mass.

Pressure Reducing Valves—
W. H. Bosworth, Cleveland, O.

Pulleys—
W. A. Jones Foundry Co., Chicago, Ill.
The Lane & Bodley Co., Cincinnati, O.

Pumps (Steam)—
Battle Creek Steam Pump Co., Battle Creek, Mich.
The Edward P. Allis Co., Milwaukee, Wis.
Henry R. Worthington, Brooklyn, N. Y.
Stilwell-Bierce & Smith-Vaile Co., Dayton, O.
W. H. Bosworth, Cleveland, O.

Punches—
Walker Bros., Lansing, Mich.

Pyrometers—
Edward Brown, Philadelphia, Pa

Radial Drills—
Dietz, Schumacher & Boye, Cincinnati, O.

Railway Supplies—
Cleveland City Forge & Iron Co., Cleveland.

Riveting Machinery—
Wm. H. Wood, Media, Pa.

Rock Drills—
Rand Drill Co., Chicago, Ill.
The Ingersoll-Sergeant Drill Co., New York.

Rolling Mill Machinery—
The Lloyd Booth Co., Youngstown, O.

Roofs—
Shiffler Bridge Co., Pittsburg.

Sand and Chill Rolls—
The Lloyd Booth Co., Youngstown, O.
Lorain Foundry Co., Lorain, O.
Seaman, Sleeth Co., Pittsburg, Pa.

Saws—
Peter Gerlach & Co., Cleveland.

Screens for Coal Ore, Etc.
Robt. Aitchison Perforated Metal Co., Chicago.
Harrington & King Perforating Co., Chicago.
Jeffrey Mfg. Co., Columbus, O.

Screws—
C. H. Besly & Co., Chicago, Ill.
Upson Nut Co., Cleveland, O.
Chicago Screw Co., Chicago, Ill.

Semi-Steel—
The King & Andrews Co., Chicago, Ill.

Shafting—
The Lane & Bodley Co., Cincinnati, O.

Shearing and Punching Machinery—
Bertsch & Co., Cambridge City Ind.
Toledo Machine & Tool Co., Toledo, O.
Long & Allstatter Co., Hamilton, O.
Perkins Machine Co., Boston, Mass.
Fox Machine Co., Grand Rapids, Mich.

Sheet Iron—
Cleveland Rolling Mill Co., Cleveland.
Ætna-Standard Iron & Steel Co., Bridgeport, O.
E. H. Stroud & Co., Chicago, Ill.

Special Machinery—
Toledo Machine & Tool Co., Toledo, O
Edwin Harrington Son & Co., Philadelphia.
Perkins Machine Co., Boston, Mass.

Steam Boiler Inspectors—
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

Steam Pipe and Boiler Covering—
C. H. Besly & Co., Chicago Ill

Steam Packing—
C. H. Besly & Co., Chicago, Ill.

Steam Shovels and Dredges—
The Bucyrus Co., South Milwaukee, Wis.
Marion Steam Shovel Co., Marion, O.

Steam Specialties—
C. H. Besly & Co., Chicago, Ill.

Steel—
Otis Steel Co., Cleveland, O.
Miller, Wagoner & Bentley, Chicago, Ill.
E. H. Stroud & Co., Chicago, Ill.

Steel Castings—
W. H. Bosworth, Cleveland, O.
The King & Andrews Co., Chicago, Ill.
Otis Steel Co., Cleveland, O.

Steel Rails, Blooms and Billets—
Cleveland Rolling Mill Co., Cleveland
Bethlehem Iron Co., South Bethlehem,
Cambria Iron Co., Johnstown, Pa.

Steel Stamps and Stencils—
J. H. Fleharty & Co., Cleveland.

Stokers—
Playford Stoker Co., Cleveland, O.
Brightman Furnace Co., Cleveland, O.
Westinghouse, Church, Kerr & Co., New York City.

Tanks—
Enterprise Boiler Co., Youngstown, O.
Meehan Boiler & Construction Co., Lowellville, Ohio.

Tinning Machinery—
W. H. Bosworth, Cleveland, O.
The Lloyd Booth Co., Youngstown, O.

Tin Plate—
Ætna-Standard Iron & Steel Co., Bridgeport, O

Tin and Terne Plates—
B. P. Crane & Co., Chicago, Ill
E. H. Stroud & Co., Chicago, Ill.

Tool Steel—
C. H. Besly & Co., Chicago, Ill.

Transmission Machinery—
Link-Belt Machinery Co., Chicago, Ill.
The Lane & Bodley Co., Cincinnati, O.
Jeffrey Mfg. Co., Columbus, O.

Tube Welding—
S. Fix Sons, Cleveland.

Turnbuckles—
Cleveland City Forge & Iron Co., Cleveland.
W. H. Bosworth, Cleveland, O.

Twist Drills—
C. H. Besly & Co., Chicago, Ill.

Valves—
C. H. Besly & Co., Chicago, Ill.
Jenkins Bros., New York City.
The Lunkenheimer Co., Cincinnati, O.

Ventilating Fans—
B. F. Sturtevant Co., Boston Mass.

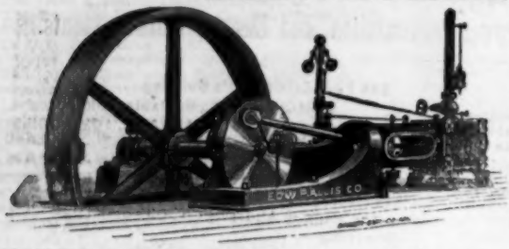
Wheelbarrows—
Akron Cultivator Co., Akron, O.
Lansing Wheelbarrow Co., Lansing, Mich.

Wire Machinery—
John Adt & Son New Haven Conn.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.
Wm. Glader, Chicago, Ill.

Wire Nail Machinery—
Wm. Glader, Chicago, Ill.

THE EDWARD P. ALLIS COMPANY

MILWAUKEE, WIS.



MANUFACTURERS OF

ICE and REFRIGERATING MACHINERY, Blowing Engines, Hoisting Engines, Pumping Engines Air Compressors, Special Engines for Electric Lighting Street Railways and Rolling Mills. Ore Crushers, Crushing Rolls, Stamp Mills Concentrators, General Mining Milling and Smelting Machinery.

Reynolds Corliss Engines.

NEW YORK. CHICAGO. MINNEAPOLIS. DENVER. BUTTE. CITY OF MEXICO. SAN FRANCISCO PITTSBURG.

WE DO IT WELL,
WE DO IT CHEAP.

Established 1836.

Having recently installed a new and modern Plant, we are prepared to do all kinds of

GALVANIZING

and solicit correspondence from any manufacturer or anyone having goods to be galvanized. Prompt and excellent work assured. Prices low, considered.

SIDNEY SHEPARD & CO., Buffalo, N. Y.

Manufacturers and Jobbers of Housefurnishing Hardware, Metals, Etc.

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The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month; the double dagger (‡) once in three weeks; the parallel (‖) three times out of four.

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IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

Special low-phosphorus hard Ore, Bessemer	$3.40@3.46
No. 1 Specular, Bessemer	3.05@3.17
No. 1 Bessemer hematite	2.60@2.90
Hematites No. 1 non-Bessemer	2.00@2.25
No 1. Specular, non-Bessemer	2.40@2.60

PIG IRON.

CLEVELAND (f. o. b. cars):	
Bessemer	$10 25@10 50
No. 1 Strong Foundry	10 65@11 00
No. 2 Strong Foundry	10 15@10 40
Gray Forge, red short	9 50
Gray Forge, neutral	9 65
No. 1 American Scotch	10 75@11 15
No. 2 American Scotch	10 25@10 50
Lake Superior Charcoal	12 00@12 25
PITTSBURG:	
No. 1 Foundry	$10 75@10 90
No. 2 Foundry	10 25@10 40
Gray Forge	9 50
White and Mottled	9 50
Warm Blast Charcoal	13 00@13 50
Cold Blast Charcoal	16 00
Bessemer	9 50
CHICAGO:	
Lake Superior Charcoal	$12 50@$13 00
Local Coke Foundry No. 1	11 50@12 00
Local Coke Foundry No. 2	11 00@11 50
Local Coke Foundry No. 3	10 50@11 00
Local Scotch Foundry No. 1	11 50@12 00
Local Scotch Foundry No. 2	11 00@11 50
Local Scotch Foundry No. 3	10 50@11 00
Southern Coke No. 1	11 00@11 25
Southern Coke No. 2	10 60@10 85
Southern Coke No. 3	10 35@10 60
Southern No. 1 Soft	11 00@11 25
Southern No. 2 Soft	10 60@10 85
Southern Silveries	11 25@11 50
Jackson Co. Silveries	12 50@14 50
Ohio Silveries No. 1	@
Ohio Strong Softeners	12 00@12 25
Alabama Car Wheel	16 00@17 00
Malleable Bessemer	10 75@11 00
Coke Bessemer	11 50@12 00
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$ 10 00
Southern Coke No. 2 and No. 1 Soft	9 75
Hanging Rock Coke, No 1	9 45
Hanging Rock Charcoal No. 1, Fdy	14 50@15 50
Tennessee Charcoal No 1	12 50@13 00
Jackson County Silvery No 1	12 50@13 00
Southern Coke, Gray Forge	9 25
" " Mottled	9 00
Standard Georgia Car Wheel	14 25@15 00
Tennessee " "	13 00@14 00
Lake Superior " "	14 25@14 50
BUFFALO:	
No. 1 Foundry Strong Coke Iron Lake Superior Ore	11 25
No. 2 Foundry Strong Coke Iron Lake Superior Ore	10 75
Ohio Strong Softener No. 1	11 75
Jackson Co. Silvery No. 1	14 00
Lake Superior Charcoal	15 50
Southern Soft No 1	11 75
Hanging Rock Charcoal	17 00
ST. LOUIS:	
Southern Coke No 1	$10 50@$10 75
Southern Coke No. 2	10 25
Southern Coke No. 3	9 75@10 00
Southern Gray Forge	9 75
Southern Charcoal No. 1	12 50
Missouri Bessemer	13 00
Ohio Softeners	14 00
Lake Superior Car Wheel	13 50
Southern Car Wheel	13 25

OLD RAILS AND SCRAP METAL.

[Delivered Cleveland.]	GROSS TONS
Old iron rails	$14 00
Old steel rails (6 ft. and over)	10 50
Old steel rails (6 ft. and under)	10 00
Old car wheels	11 00
	NET TONS
No. 1 R. R. wrought scrap	$11 50
Mill scrap	8 50
No. 1 Machine cast scrap	8 00
Iron axles	15 00
Axle turnings	8 00
Wrought turnings (free from cast)	6 50
Cast borings	5 25
Uncut wrought iron boilers	3 50
Steel boiler plates	8 00
Grate bars	5 25
Pipes and flues (clean)	7 50
Tank iron	7 00
Hoop and band iron	6 50
Sheet iron	5 00
Wrought drillings	6 00
Malleable iron	8 50

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. Cleveland)	1.15c
Angles	1.10c
Tees	1.25c
Universal Plates	1.15@1.20c
Sheared Plates	1.20c

MERCHANT IRON AND STEEL.

[Less than car-lots, Cleveland.]

Rounds and Squares.—Bar Iron.

1 to 1⅞	1.10 Base.
2 to 2⅞	.20 extra.
3 to 3⅜	.50 "
3⅜ to 4	.80 "
4⅛ to 4½	1.00 "
4⅝ to 5	1.30 "
5⅛ to 6	1.60 "
6⅛ to 6½	2 20 "

6⅝ to 7¾	2.50 extra.
¾ to ⅞	.10 "
⅜ to 11-16	.20 "
½ to 9-16	.30 "
7-16 to 15-32	.40 "
⅜ to 13-32	.50 "
5-16 to 11-32	.70 "
¼ to 9-32	.90 "
7-32	1.40 "
3-16	2.50 "

Flats.—Bar Iron.

1¼ to 4 x ⅜ to 1	1.05 Base.
4¼ to 6 x ⅜ to 1	.10 extra
6¼ to 8 x ⅜ to 1	.60 "
8¼ to 10 x ⅜ to 1	.80 "
1⅜ to 4 x 1 1-16 to 1½	.30 "
4¼ to 6 x 1 1-16 to 1½	.40 "
6¼ to 8 x 1 1-16 to 1½	.60 "
8¼ to 10 x 1 1-16 to 1½	.90 "
2 to 4 x 1⅝ to 2	.50 "
4¼ to 6 x 1⅝ to 2	.60 "
6¼ to 8 x 1⅝ to 2	.80 "
8¼ to 10 x 1⅝ to 2	1.00 "
2 to 4 x 2⅛ to 3	.60 "
4¼ to 6 x 2⅛ to 3	.80 "
6¼ to 8 x 2⅛ to 3	1.00 "
1⅜ to 1⅜ x ⅜ to 1	.10 "
1 to 1 1-16 x ⅜ to ⅞	.20 "
⅜ to 15-16 x ⅜ to ¾	.40 "
⅜ to 11-16 x ⅜ to ⅝	.50 "
⅜ to 9-16 x ⅜ to ½	.90 "

Heavy Band Iron.

7 to 10 x ¼ to 5-16	.70 extra.
6¼ to 6¾ x ¼ to 5-16	.50 "
4¼ to 6 x ¼ to 5-16	.30 "
1⅜ to 4 x ¼ to 5-16	.20 "
1 to 1⅜ x ¼ to 5-16	.30 "
⅜ to 15-16 x ¼ to 5-16	.50 "
⅜ to 11-16 x ¼ to 5-16	.80 "
⅜ to 9-16 x ¼ to 5-16	1.00 "
⅜ to 7-16 x ¼ to 5-16	1.50 "

Heavy bands, 7-32 in. thick 1-10 c. per lb. higher than ¼ to 5-16 thick. **Bevel Edge Shaft Iron** 1-10 higher than same size of Heavy Bands.

Light Band Iron.

7 to 8 x No. 9 to 3-16	.90 extra.
7 to 8 x Nos. 10, 11 and 12	1.00 "
6¼ to 6¾ x No. 9 to 3-16	.70 "
6¼ to 6¾ x Nos. 10, 11 and 12	.80 "
4¼ to 6 x No. 9 to 3-16	.50 "
4¼ to 6 x Nos. 10, 11 and 12	.60 "
1¾ to 4 x No. 9 to 3-16	.40 "
1¾ to 4 x Nos. 10, 11 and 12	.50 "
1 to 1 3-16 x No. 9 to 3-16	.50 "
1 to 1 3-16 x Nos. 10, 11 and 12	.60 "
13-16 to ⅞ x No. 9 to 3-16	.60 "
13-16 to ⅞ x Nos. 10, 11 and 12	.70 "
11-16 to ¾ x No. 9 to 3-16	.80 "
11-16 to ¾ x Nos. 10, 11 and 12	.90 "
9-16 to ⅝ x No. 9 to 3-16	1.00 "
9-16 to ⅝ x Nos. 10, 11 and 12	1.10 "
7-16 to ½ x No. 9 to 3-16	1.30 "
7-16 to ½ x Nos. 10, 11 and 12	1.40 "
⅜ x No. 9 to 3-16	1.50 "
⅜ x Nos. 10, 11 and 12	1.60 "

Bevel Edge Box Iron.

Same as Light Bands, of same sizes.

Beaded Band Iron, 1¼ in. to 2 in.

Sand Band Iron, 1-10 c. above same sizes of Light Bands.

Oval Iron.

⅜ to 1¼	.40 extra.
¾ to 13-16	.50 "
⅜ to 11-16	.60 "
½ to 9-16	.80 "
⅜ to 7-16	1.10 "
½ to 9-16 x 3-16	1.00 "
⅜ to 11-16 x ⅛	1.20 "

Half Oval and Half Round.

2¼ to 3	.60 extra.
⅞ to 2	.50 "
¾ to 13-16	.70 "
⅜ to 11-16	.90 "
½ to 9-16	1.20 "
⅜ to 7-16	2.50 "
5-16	3.50 "
¼	4.50 "

Half Ovals less than ¼ their width in thickness, extra price.

Horse Shoe Iron.

All sizes 1 c. extra.

Cutting ordinary bars to specified length, .20 to .30 extra, according to length and size.

Steel Bands.

Width In Inches.	English Standard Gauge.		
1 1-2 to 6,	Nos. 7, 8, 9 or 3-16"	1.50	Base.
1⅜ to 6,	" 10, 11, 12 or 1/4"	.05	per 100 lbs. Extras.
1 to 1⅜,	" 7, 8, 9 or 3-16"	.10	"
1 to 1⅜,	" 10, 11, 12 or 1/4"	.15	"
13-16 and ⅞,	" 7, 8, 9 or 3-16"	.20	"
13-16 and ⅞,	" 10, 11, 12 or 1/4"	.25	"
11-16 and ¾,	" 7, 8, 9 or 3-16"	.30	"
11-16 and ¾,	" 10, 11, 12 or 1/4"	.35	"
9-16 and ⅝,	" 7, 8, 9 or 3-16"	.40	"
9-16 and ⅝,	" 10 11, 12 or 1/4"	.45	"
½,	Nos. 7, 8, 9 or 3-16"	.55	"
⅜,	" 10, 11, 12 or 1/4"	.60	"
7-16	" 7, 8, 9 or 3-16"	.75	"
7-19	" 10, 11, 12 or 1/4"	.85	"
⅜,	" 7, 8, 9 or 3-16"	.95	"
⅜,	" 10, 11, 12 or 1/4"	1.05	"

Iron and Steel Hoops.

Width in Inches.	English Standard Gauge.		
1 7-16 to 3	Nos. 13, 14, 15 and 16	1.60	Base. Extras
1 7-16 to 2,	" 17, 18, and 19	.05	per 100 lbs.
1 7-16 to 2,	" 20	.10	"
1 7-16 to 2,	" 21	.15	"
1 -16 to 1¾,	" 22	.25	"
1 to 1¾,	" 13, 14 and 15	.05	"
1¾	" 16,17 and 18	.10	"

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Perforated Iron, Steel, Copper, Brass, Tin, Zinc, Lead, Etc., to Order. Large and Varied Assortment of Sizes. Correspondence Solicited.

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3. Contain JENKINS DISC, which is suitable for all Pressures of Steam, Oil and Acids
4. The Easiest Repaired, and all parts Interchangeable.
5. Every Valve Tested before leaving the factory. (2)
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RE-INFORCED TRAYS.
SOLID FRAME.
NO HOLES DRILLED INTO IT.
ALL PARTS CLAMPED ON.

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Strongest, Easiest Handled.
Lightest and Most Durable.

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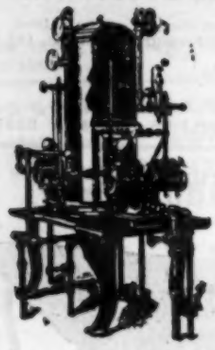

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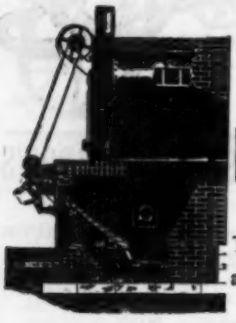

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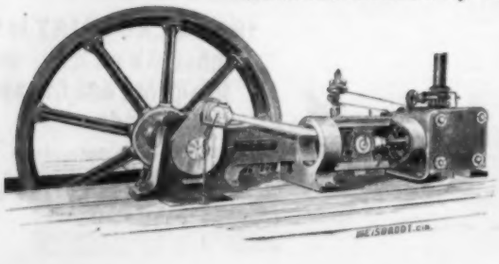

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1 1/16 to 1 3/16,	"	19 and 20	.15 per 100 lbs.
1 1/4 to 1 3/8,	"	21	.20 "
1 3/8 to 1 3/8,	"	22	.30 "
15-16 and 1,	"	13, 14 and 15	.10 "
15-16 and 1,	"	16, 17 and 18	.15 "
15-16 and 1,	"	19 and 20	.20 "
15-16 and 1,	"	21	.25 "
15-16 and 1,	"	22	.35 "
7/8,	Nos.	13, 14 and 15	.20 "
7/8,	"	16, 17 and 18	.25 "
7/8,	"	19 and 20	.30 "
7/8,	"	21	.35 "
7/8,	"	22	.45 "
3/4 and 13-16	Nos.	13, 14 and 15	.30 "
3/4 and 13-16	"	16, 17 and 18	.35 "
3/4 and 13-16	"	19 and 20	.40 "
3/4 and 13-16	"	21	.45 "
3/4 and 13-16	"	22	.50 "
3/4 and 13-16	"	23	.60 "
11-16,	Nos.	13, 14 and 15	.35 "
11-16,	"	16, 17 and 18	.40 "
11-16,	"	19 and 20	.50 "
11-16,	"	21	.60 "
11-16,	"	22	.70 "
11-16,	"	23	.80 "
5/8,	Nos.	13, 14 and 15	.40 "
5/8,	"	16, 17 and 18	.45 "
5/8,	"	19 and 20	.55 "
5/8,	"	21	.65 "
5/8,	"	22	.75 "
5/8,	"	23	.85 "
9-16,	"	13, 14 and 15	.45 "
9-16,	"	16, 17 and 18	.50 "
9-16,	"	19 and 20	.60 "
9-16,	"	21	.70 "
9-16,	"	22	.80 "
9-16,	"	23	.90 "
1/2,	"	13, 14 and 15	.55 "
1/2,	"	16, 17 and 18	.60 "
1/2,	"	19 and 20	.70 "
1/2,	"	21	.80 "
1/2,	"	22	.90 "
1/2,	"	23	1.00 "
7-16,	"	13, 14 and 15	.80 "
7-16,	"	16, 17 and 18	.90 "
7-16,	"	19 and 20	1.00 "
3/8,	"	13, 14 and 15	1.00 "
3/8,	"	16, 17 and 18	1.10 "
3/8,	"	19 and 20	1.20 "

Sheet Iron.

No. 10	1 50
No. 12	1 70
No. 14	1 60
No. 15-17	1 75
No. 18	1 85
No. 20	2 00
No. 22-24	2
No. 25-26	2 20
No. 27	2 30

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Jessop's	15 1/2c
Hobson's "Best"	15 1/2c
" "Choice"	35c

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 35
Shell	1 45
Flange	1 55
Marine Flange	1 60
Fire Box	2 05

Above includes plates 90 inches wide.

90 to 96 in. wide	1/2c. lb. extra
96 to 100 in. wide	1c. "
100 to 104 in. wide	1 1/2c. "
104 to 106 in. wide	special.

Flats. cts. lbs.

2 to 9-16 in. wide by 2 to 3/8 thick	.08

Bessemer and O. H. Steel.

Bessemer Machinery	base price,	1 40
Open-hearth Tire	"	1 45
Open-hearth Spring	"	1 80
Sleigh Shoe	"	1 45
Toe Calk	"	1 90
Cutter Shoes, tapered and bent	"	1 60

American Cast Tool Steel.

ROUND, SQUARE, AND OCTAGON.	cts. lbs.
1 to 2 in. inclusive	.08
9-16 to 1/8 in. "	.08
7-16 to 3/8 and 2 3/8 to 3 in	.09
3 1/4 to 4 in	.09 1/2
5/8 to 11-16 and 4 1/2	.10
1/8 to 6 in	.10 1/2
1/4 to 9-32 and 6 1/2 to 7 in	.11
1 in	.13

Burden Boiler Rivets.

1/4, 5/8, 11-16 and 3/4 inches diameter	3 co
Bridge 1/4, 5/8, 11-16 and 3/4 inch diam	2 55

Wrought Pipe and Boiler Tubes.

Lap weld black, base, and 10 per cent	.78
Butt " " " "	.72
Lap " galv. " "	.70
Butt " " " "	.67
Boiler tubes 2 1/4" and smaller	.72 1/2
Boiler tubes 2 1/4" and larger	.75
Casting screw and socket joint	dis. 50
Casing inserted joint	dis. 45

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American	₩ lb 9@10
Wright's	₩ lb 12

Bellows.

Blacksmiths'	Hill's	dis 40
	Bullock's	dis 50&10
Moulders'		dis 40@40&10
Hand		dis 40&10@50

Rivets.

Iron, Thousand, list November 1, 1894.....dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894.....dis 60@65
Copper.....dis 50@50&10

Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list.....dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2½ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 55
Pulley Taps.....dis 40

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 35

Wire.

New List, Apr. 9, 1894

Brass.....dis 35
Copper.....dis 35
Bright and annealed, Nos. 0@18.....dis 70&10@70&5
" " Nos. 19@26.....dis 75@75&5
" " Nos. 27@36.....dis 75&10&5
Coppered Nos. 0 to 18, market list.....dis 70@70&5
Galvanized Nos. 0 to 18 " " .....dis65&5
Tinned market Nos. 0 to 18.....dis 67½
Cast steel.....dis 50
Tinned Broom Wire.....dis 70&5@70&10
Annealed Fence, Nos. 8 and 9.....dis 75
Annealed Grape, Nos. 10 to 14.....dis 75
Stub's Steel Wire regular.....95c ₩ lb dis 30

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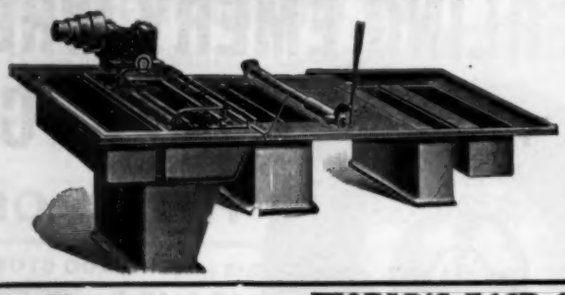

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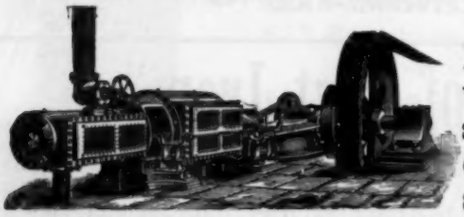

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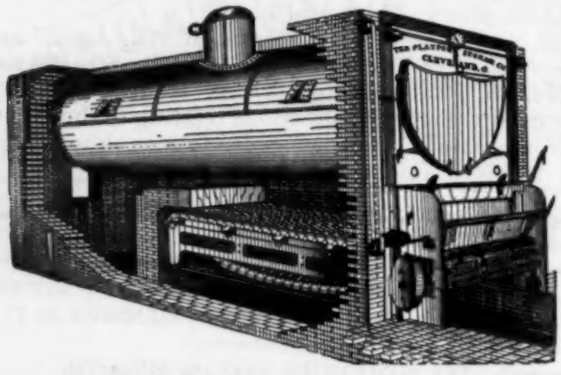

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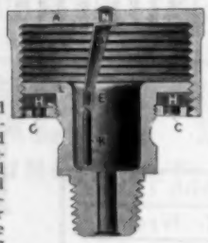

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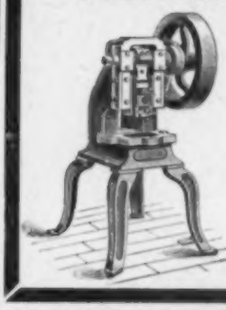
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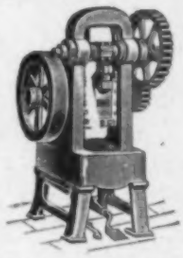
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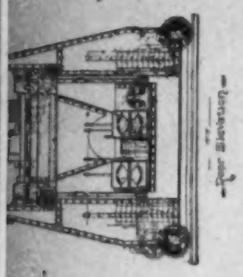

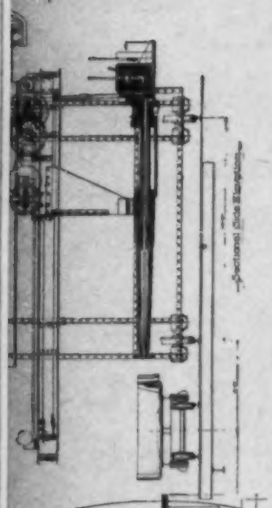

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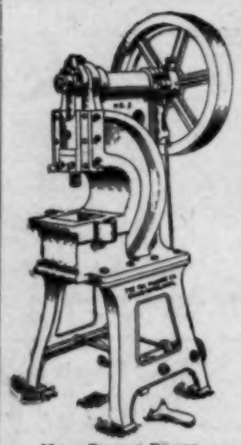

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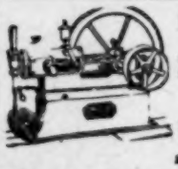

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